# Marine Review

*The National Publication Covering the Business of Transportation by Water*

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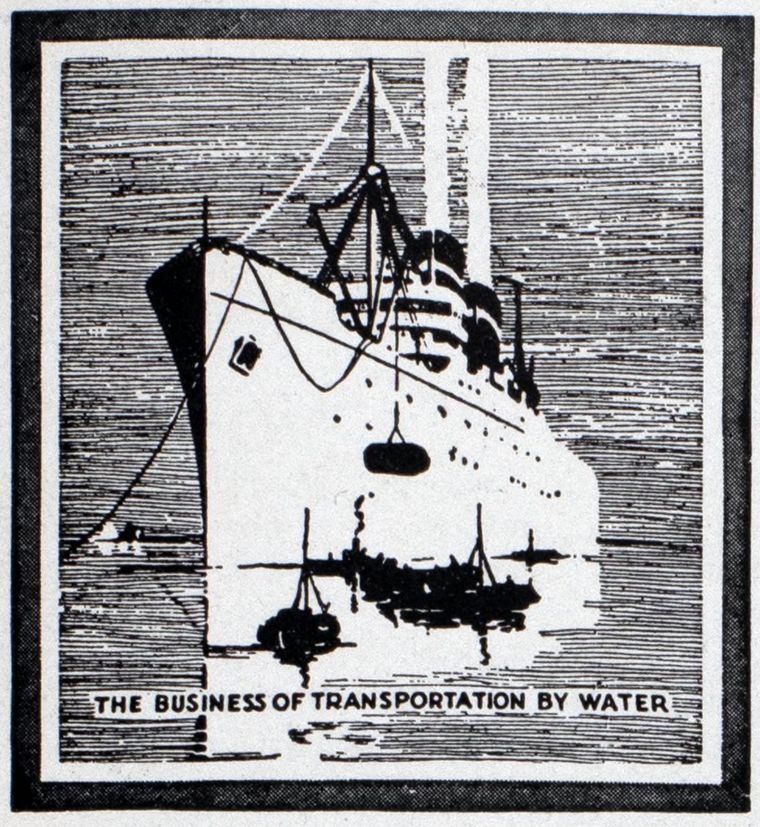



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# Marine Review
## December 1930

*J. R. Sensibar—A Turbine Electric Self-loading and Unloading Hopper Dredge and Bulk Carrier—Completed Nov. 13, 1930.*

# « EDITORIAL »

## Vessels for Special Service a Factor in Shipbuilding

THE growing significance of vessels for special service is not fully appreciated in considering shipbuilding prospects. Large elaborate and very costly ships, for instance, have been built within the last two years in Great Britain for a rejuvenated whaling industry which has been quick to adopt the advanced tools of our mechanical age.

In this issue there is described and illustrated a remarkable special service vessel to meet the demands of an industry which has grown up with hardly any notice. Dredges are not unfamiliar as special service vessels nor are, within the last few years, at least, bulk self unloaders; but a great vessel combining the two functions in one is unique and is an example of the courageous initiative and resourcefulness of the leaders of a new industry. The cost of this vessel, for instance, represents fully one-fortieth of the annual shipbuilding program of the United States which at the present time is said to be about $75,000,000. The chances are that in the estimate of $75,000,000 no accurate account was taken of vessels for special service and that instead of being a part of this annual expenditure, the building of such vessels adds millions of dollars of work for the shipyards and machinery and equipment builders.

Nearly $2,000,000 have been spent in building and equipping the vessel referred to and this does not include a new hull, but covers the alterations and additions to an old hull and the cost of propelling machinery, pumping plant, self unloading machinery and equipment and its installation.

We sometimes forget the vast extent of our domestic affairs and the consequent requirements for floating equipment of the most varied character. What may be expected in the next five, ten, fifteen years in the way of replacements and additions to our fleets of vessels for special service? A careful study of the present extent and probable future needs of the United States in this class of vessel would show, it is believed, a surprisingly large amount of work required, which means more activity for shipyards, machinery builders and for all those who build equipment of any kind for ships.

# Honor Retiring President

ELECTION as president of the Society of Naval Architects and Marine Engineers is a real honor. To fill that office with particular distinction and practical effectiveness as the retiring president, Homer L. Ferguson, has done adds luster and prestige to the society.

It was, therefore, fitting that the society should adopt a resolution recording its sense of gratitude for his devotion to its interests and the advance made under his leadership in inaugurating the establishment of scholarships, prizes for papers, increasing the membership and the indexing of the transactions. The society has been honored, the resolution stated, by having its highest office filled by one whose eminence in the field of shipbuilding is international, not only as a shipbuilder, but as a forceful and powerful advocate of the American merchant marine.

These sentiments will be completely endorsed by all those who know the retiring president and his loyalty with heart and mind to the profession which he entered as a young officer of the construction corps of the navy.

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# Join Load Line Convention

SELDOM has there been so complete an agreement among all the experts as there is on the practical good sense of the international rules and regulations governing load lines for ships which resulted from the conference held in London this past summer. The United States should become a signatory to this convention by prompt approval on the part of congress. A resolution urging such action was adopted by the Society of Naval Architects and Marine Engineers at their annual meeting.

The part taken by the United States in the London load line convention has been outlined in some detail in a paper on *Load Line Regulations* prepared by David Arnott, chief surveyor of the American bureau of shipping, and presented at the last meeting of the society. There was a general feeling on the part of the committee, it was stated in this paper, that the present freeboards for ordinary cargo ships were on the whole satisfactory and there was no body of opinion in favor of reducing freeboards except in the case of tankers, timber ships and certain special types. Opinion was practically unanimous that the present freeboards for flush deck vessels should be increased to provide greater safety to the crew. The United States delegates presented data on the safe operation of American tankers over a period of years with drafts in excess of those obtained from the board of trade rules.

Whatever our interests may be, distinct from those of any other nation, we are one with them in every reasonable measure to increase safety of life at sea. We can only approach the discussion of the technical features through qualified and trusted representatives. These representatives, neglecting no special feature of American shipping in which certain modifications to the general rules are necessary, now recommend official agreement on the part of the United States to the findings of the convention. There seems to be no question to debate. It should be adopted and adopted without delay for the good of shipping all over the world.

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# Don't Delay Super Liners

A DEFINITE step in the building of the first of the two cabin liners for the United States lines will take place at Camden, N. J., on Dec. 6 when the keel is to be laid. Appropriate ceremonies are to be held to mark this important event. This ship and its sister ship will be the largest merchant vessels ever undertaken in the United States. They represent a fine type of ship and will add greatly to the existing facilities of the United States lines in the Atlantic service. The importance of these vessels in the American merchant marine must not be minimized, but at the same time it must be borne in mind that they cannot compete against first class liners like the BREMEN and EUROPA and the new Cunarder recently ordered. No competition in any real sense can be presented by the United States lines in the transatlantic service until it has acquired two super liners comparable to the best now in service and to come.

No one would urge haste which might mean poorly conceived plans. All the time necessary for the most thorough study and planning should be allowed. Delays, however, due to any other reason should not be tolerated. It is fully appreciated that the merchant marine act of 1928 in its provisions for graduated mail pay does not take into account what increasing speed means above 22 knots. To go from the LEVIATHAN'S sea speed of 24 knots to the 28 for the BREMEN and EUROPA and the 32 and 33 knots in mind for the new Cunarder, are developments completely outside of the ken of those who had a hand in drafting the act of 1928. An amendment seems to be necessary and should be approved in the coming session.

In the meantime no delay should be permitted in all the preparations leading up to the taking of bids, remembering that it will take at least two full years after the keels are laid before these ships are ready for service. They should be ready to meet the new Cunarder and possibly the proposed new White Star, French and Italian liners.

# Naval Architects in Annual Meeting

## Look for Continued Activity in Shipbuilding—Must Build Freighters—Favor Adoption of Load Line Convention—J. Howland Gardner Elected President

IT IS A long time since American naval architects and marine engineers have met with the same assurance of work in hand and orders to come for the next four years or so. There are, however, two noticeably bad spots in the widespread activity in shipbuilding. No orders are under way in West coast shipyards and there is but little work on the Great Lakes.

The society is taking on some of the good characteristics of age. The thirty-eighth annual meeting was held at New York Nov. 13 and 14 and excepting for the mushroom period of the war, meetings have never been better attended. The standing of the society as a powerful influence for good in the marine industry is undoubtedly greater today than at any time in the nearly 40 years that it has been in existence.

### Retiring President Is Commended

Homer L. Ferguson, the retiring president, has served the society during his three years in office with exceptional devotion and vigor. He has emphasized the necessity of research and the society is sponsoring scholarships for this purpose. He has brought out the necessity of closer co-operation with the younger men on whom the continued success of the society must rest. He instituted a practical campaign for membership which resulted in the addition of 210 new members, associates and juniors. His administration of the affairs of the society has been very helpful to its increasing strength and prestige. A resolution of tribute for his good work was moved by Charles P. Wetherbee. In an especially appropriate speech this resolution was seconded by J. Howland Gardner, incoming president and was unanimously approved by the members present.

Besides the newly elected president, J. Howland Gardner, who is president of the New England Steamship Co., Joseph W. Powell, president of the United Dry Docks, Inc. and Richard M. Watt, were elected honorary vice presidents. Rear Admiral George H. Rock, C. C. U. S. N. chief constructor of the navy, Charles F. Bailey, engineering director of Newport News Shipbuilding & Dry Dock Co. and Samuel W. Wakeman, vice president of the Bethlehem Shipbuilding Corp. were elected vice presidents of the society for a term of three years. John F. Metten, and Ernest H. Rigg, naval architect of the New York Shipbuilding Co. and William H. Todd, president of the Todd Shipyards Corp. and Hugo P. Frear, noted naval architect, were elected vice presidents to fill unexpired terms until Dec. 31, 1931. Daniel H. Cox, naval architect was re-elected secretary-treasurer, an office he has held with conspicuous attention to duty for many years. Thomas J. Kain, who has also served the society faithfully for many years, was re-elected assistant secretary-treasurer.

One of the important references made by Mr. Ferguson was on the need of an energetic program of shipbuilding to replace the freight vessels now operating under the American flag. The government, he thought, should aid private interests in the development of this hitherto neglected classification of our merchant marine. His annual address before the society follows in part:

**J. Howland Gardner**
*President-Elect Soc. Naval Architects & Marine Engineers*

"The last quarterly report issued by Lloyds Register of Shipping shows that there are 2,568,000 gross tons of merchant vessels under construction throughout the world and that the United States has retained second place, which position we reached a year ago. Although we occupy this high relative position, we are but a poor second to Great Britain. Great Britain is building 43 per cent of the total tonnage and the United States but 8 per cent. Instead of the 5.5 ratio, accepted as proper in naval circles, the present merchant construction figures indicate a disparity greater than 5.1.

"If shipbuilding is to continue in anything approaching a prosperous condition, we must look to the freight carriers.

"While the building up of our passenger fleet is most vital, freight ships are the very backbone of the merchant marine, and it is unthinkable that we should continue to be lax in this respect and allow our freight ships to disappear from our foreign trade. On account of the greatly increased cost of building ships in the United States over their cost in Europe, as well as the higher cost of operation. American owners of cargo carriers are under a tremendous handicap, as their revenue must come from the going competitive freight rates.

"In the last five years Great Britain has built more than 500 cargo vessels of 2000 tons or over, while the United States has built only three. In the last two years there has been a decided increase in the building of freight vessels throughout the world, but there are none being built in the United States at the present time.

### Looks to Congress for Aid

"At present we are carrying in our own ships only about one-third of our foreign trade, which means that for two-thirds of our foreign trade we must depend upon the ships of other nations. To put us on the seas where we belong we should be carrying at least half of our own trade, which means that average yearly replacement of cargo tonnage should amount to nearly 750,000 tons.

"The nature of government aid to be provided will have to be worked out by our legislators. It is suggested that the government lend a larger percentage of first cost on this type of vessel, waive interest during construction and defer payment of interest for a period of years after completion of the vessel."

Rear Admiral D. W. Taylor, retired, past president it was noted had received the John Fritz medal for outstanding engineering achievements. The Society of Naval Architects & Marine Engineers in further recognition of his work voted an award of $500.

A resolution was unanimously adopted by the society favoring the agreement of the United States with the terms of the international load line convention covering merchant shipping. This agreement was approved by the American delegates which were sent to London under the auspices of our government. It was

pointed out by Rear Admiral J. G. Tawresey, retired, and H. G. Smith, president of the National Council of American shipbuilders that adoption of the convention by the United States would be of benefit to shipowners, travelers, shippers and insurance interests. Acceptance of the agreement would help to mold uniform regulations for ship loading all over the world. To become effective the regulations must be adopted by five nations. Each nation entering into the agreement automatically adopts the rules laid down for loading merchant ships. Copies of the society's resolution on the adoption of the international load line agreement were sent to President Hoover, the secretaries of state and commerce and to the chairman of the senate committee on foreign relations.

The committee on the endowment fund income reported a total income for the year including entrance fees of $6385.21. Of this amount $1500 is to be set aside and added to the trust. No expenditure was recommended this year for advanced scholarships in naval architecture or marine engineering, thus making $2000 available for this purpose next year. A special cash prize of $500 was recommended as an award to Rear Admiral David W. Taylor, United States navy, in recognition of his great service to the society in the series of papers from time to time contributed to its proceedings. The committee also recommended use of such portion as may be necessary of the balance of the income for indexing the proceedings of the society and that a special committee be appointed to undertake and supervise this work. The unexpended balance after carrying out the recommendations noted is to be added to the principal of the fund.

### Technical Papers Presented

FOURTEEN papers were presented during the two days' meeting of the society, Nov. 13-14. These papers and all of the discussions oral and written will be published in full in the transactions of the society which will be available about June, 1931. The titles and names of the authors of these papers and brief abstracts follow.

1. *The Construction of Diagrams for Formulas*, by Prof. Herbert L. Seward, member.

In this interesting paper the author discusses the construction and use of diagrams for expressing relations between variables. He points out that practically all useful diagrams can be worked out without the use of the higher mathematics; that algebra and trigonometry will serve in almost all instances. He discusses types of diagrams and functions of scale and gives numerous illustrations to show the methods pursued.

This is a useful paper in pointing to the graphic method for eliminating tedious computations. Several interesting discussions were presented.

2. *Uses of Aluminum in Shipbuilding*, by Paul V. Faragher, visitor.

The author is metallurgist of the Aluminum Company of America. He pointed out that a paper on aluminum was presented before the society in 1895, that interest in this metal for shipbuilding purposes had been aroused by its use in building the yacht DEFENDER. The use of this metal in the case of the DEFENDER started a controversy over its suitability for marine use. The author declares that there was doubtless corrosion from the action of the salt spray on the alloy that was used and that the attack was accelerated by the contact of the metal with the bronze plates and rivets. There was no actual failure, however, until long after the races were won.

Much progress has been made since these early days in improving the alloys of aluminum and in the proper appreciation of the corrosion problem and the methods of protection now available. In spite of this it is only within the last few years that any definite trend has been seen in the use of aluminum for marine construction. Lightness required by the limitation on the displacement of cruisers has led the navy department to become pioneers in the use of aluminum in shipbuilding.

He pointed out that aluminum alloys are now available in the forms in which other structural materials are produced. These shapes are rolled on a blooming mill and structural shape mill identical with those used for rolling steel shapes. The largest shape available at the present time is a ten-inch ship channel which can be heat treated and supplied in lengths up to 85 feet. Some figures were given on mechanical properties for wrought aluminum alloys. Riveting, welding, hot forming, weight saving and casting alloys were touched upon as were corrosion and methods of protection. In this connection it has been learned that careful cleaning of the surface may exert as much influence as the choice of paint which is applied. The best protective coating has been found to be aluminum paint made by adding aluminum bronze powder to a suitable vehicle, usually a long oil varnish.

Aside from use of aluminum alloys in ship construction and in flying boats by the navy department it has not been nearly as widely adopted in shipbuilding as on land. Two of the cup defenders were equipped with aluminum alloy masts. Much of the superior performance of the ENTERPRISE was attributed by the defeated challenger to the use of the aluminum alloy mast. Use of this material has been a gradual development and the future for structural application of aluminum alloys in ship construction seems to be assured.

The discussion centered on methods of preventing corrosion, strength of various alloys, danger of internal deterioration and methods of manufacture, particularly riveting and welding.

3. *Ship Design from the Operator's Point of View, with Particular Reference to Cargo Handling and Stowage*, by William B. Ferguson, member; Carl E. Petersen, life member and Harry E. Stocker, visitor.

As one of the co-authors of this paper, H. E. Stocker, conducts the dock management and cargo handling section of MARINE REVIEW, it will be found abstracted at length on pages 52-56. It was received with the liveliest interest since it touched upon a phase of ship construction which has received little or no attention in the shape of a formal paper before the society. The discussions were generally favorable and enlarged upon the object of the paper. As a part of the discussion an interesting moving picture was shown of dock operations with mechanical equipment at New York. Some practical good will come from this paper in directing the attention of the society to the problem of cargo handling and stowage as it affects the design of the ship.

4. *Load Line Regulations with Special Reference to the International Load Line Convention*—1930, by David Arnott, member.

The author is chief surveyor of the American bureau of shipping and he was a member of the United States delegation to the international load line conference held in London, 1930.

This paper presents a summary of the various load line committees from 1919 up to the present time which helps to clear up the rather confused and scattered literature on this subject. He then goes into some length on the activities of the international load line conference. It is pointed out that the new load line regulations of the department of commerce are in general conformity with the convention and that the convention is the result of the combined experience of all the maritime nations with regard to the loading of merchant vessels. Seven illustrations accompany the paper. Anyone interested in this subject of load line regulation and the manner of its growth will find in this paper a clear and interesting review.

5. *The S. S. Leviathan, Damage, Repairs and Strength Analysis*, by John L. Wilson, member.

The author is assistant chief surveyor of the American bureau of shipping. Structural failure in the form of an almost complete fracture of the strength deck has been sustained by the two largest trans-Atlantic liners, the S. S. MAJESTIC and the S. S. LEVIATHAN. That of the LEVIATHAN occurred on Dec. 11, 1929, five years later than that of the MAJESTIC. This paper reviews the damage and correction of these failures

which has been published more or less in marine publications and also presents a comparative strength analysis.

The conclusions of the author after carefully considering a laboratory study of the steel together with comparative research data relative to the study of the LEVIATHAN'S strength deck failure is given in the following summary.

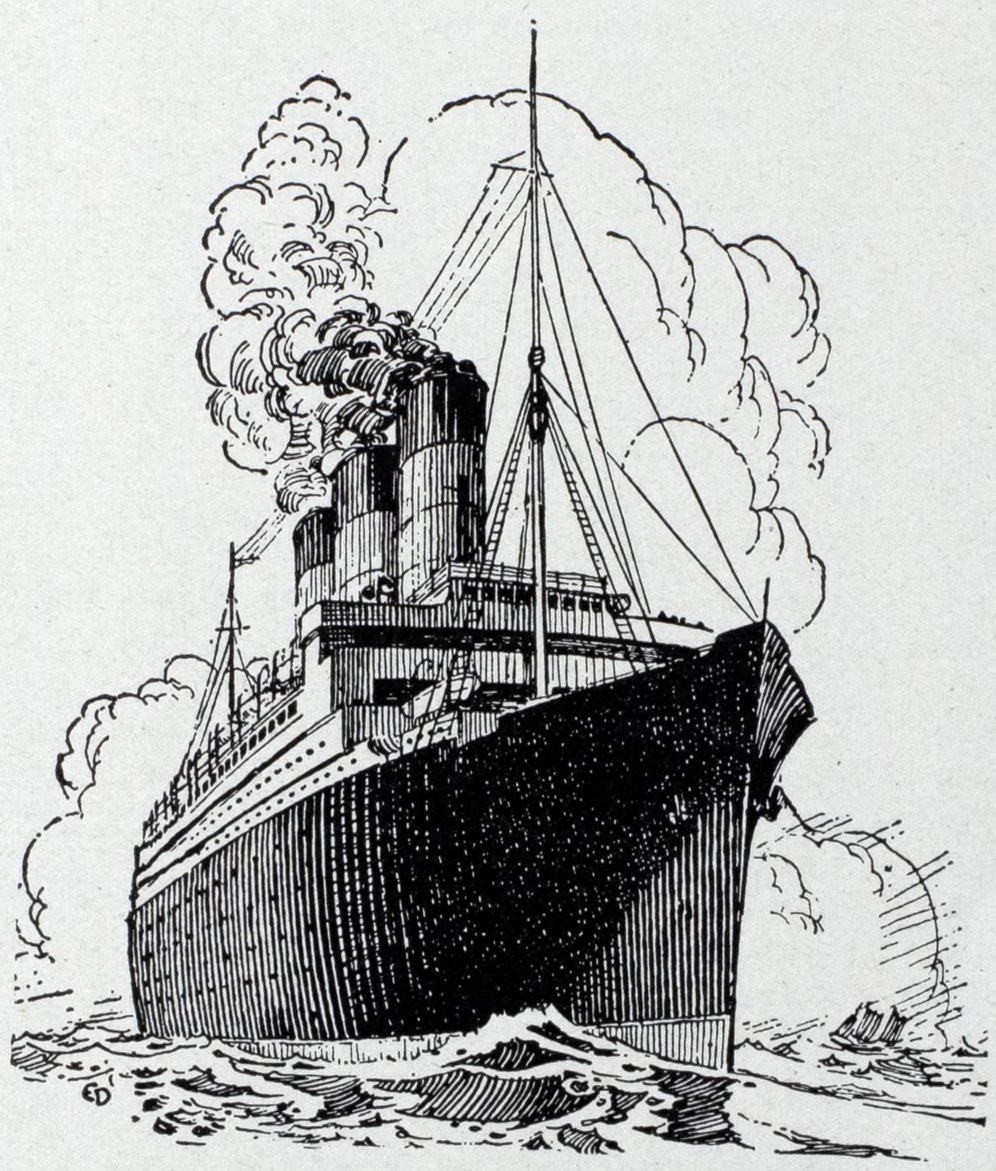
1. General—the failure was caused by fatigue as a result of a stress cycle just barely exceeding the endurance limits of the steel.

2. Specific—A-1 standard stress values extrapolated for vessels of over 600 feet in length are unsatisfactory or at least insufficient as a safe criterion for design purposes.

A-2. Range of stress comprising axial tension and compression should form the basis for a proper strength analysis of vessels 600 feet or more in length. A-3. Stress range should not exceed the endurance limits for the material used. B-1. Weight distribution especially with respect to consumable items as fuel and fresh water is of primary importance as related to strength and structural economy. C-1. Finally and to keep pace with other branches of engineering, analytical methods should be carefully checked by measuring stresses in operation under known conditions in order that the combined research data may afford a maximum degree of assurance in the use of design factors. In a discussion presented by Carl E. Petersen and Lorentz Hansen issue is taken with the findings set down in this paper as the reason for failure. "In conclusion" the discussion referred to states, "we consider that the trouble with the LEVIATHAN is due to matters arising out of the conversion from coal to oil, with the concentration of fuel oil stowage forward which gives a poor distribution of weights in the hogging condition and with the vessel operating at a deeper draft and higher speed in rough weather than considered within the province of the original design. While present knowledge of the strength of large liners is largely of a comparative nature, it has been generally considered that the tension stresses should not exceed ten tons per square inch for the largest liners whereas the stresses in the LEVIATHAN as pointed out, appreciably exceed this. To this fact we consider is due this failure of structure rather than to the range of stress upon which Mr. Wilson lays such importance in this instance."

6. *Natural Frequencies of Hull Vibration*, by Lieut. W. P. Roop (CC), U.S.N., visitor.

The author deserves credit for the time and great effort he has devoted to this study. It is only by such energetic tackling of the theory that we can ever hope to be successful in practice. It is pointed out that the best way to eliminate troubles and vibrations is to remove their source. This cannot always be done and accurate estimates of natural hull frequencies would be useful in design as engine frequencies might then be kept clear. In this paper results of tests made on a number of naval vessels are reported and methods of calculations discussed which are designed to permit prediction of natural frequency. In all the cases included, vibration is in the vertical frame in the fundamental mode with two nodes only. Several discussions were presented particularly one by Professor Lewis who is an authority in the important study of vibration.



7. *Results of Experiments upon Bulbous Bows*, by Prof. Edward M. Bragg, member.

The author is professor of naval architecture and marine engineering at the University of Michigan. These experiments were conducted at the University of Michigan naval tank for the United States shipping board under the direction of Rear Admiral D. W. Taylor, retired.

It was desired to find the effect upon resistance of variation in the tangent to the sectional area curve at the forward perpendicular and also the effect of varying the amount of area at the forward perpendicular. It is known that the driving qualities of a form depend to quite an extent upon the shape of the sectional area curve. At certain speed length ratios a fullness of form calls for a hollow shape of sectional area curve forward and aft, while at other speed length ratios it is better now to have hollows.

Use of the bulbous bow offers opportunity for unsymmetrical movements of displacement. The bulb may be formed by taking displacement from the region of the load water line and placing it at the keel, in which case the movement is mainly vertical with some horizontal component, or the movement may be almost entirely horizontal with practically no vertical component.

Some of the discussion following this paper was based on the effect of the frictional coefficient used. It was also pointed out that the results obtained with these models which are 10 and 12 feet in length and those of 20-foot models at the Washington tank duplicating five of the ten-foot models tested at the Michigan tank, indicated generally no improvement or but slight variation from results of the standard series. As the author stated in his paper, these experiments, it would appear did not simplify but rather complicated the problem of selecting the proper form of hull for a given set of conditions. This is interesting but it is rather discouraging to the practical minded man who might have hopes of having the best form indicated by model experiments. 8. *The Interior Decoration of the Passenger Liner*, by Harry B. Etter, member. The author is interior architect for Gibbs & Cox, Inc. This paper was presented at an evening meeting held Nov. 13 in the auditorium of the Westinghouse Lighting Institute, Grand Central Palace, New York city. The artistic and decorative character of the lighting at the institute furnished an excellent setting for the paper. During the discussion the modern interior lighting effects on modern ships, such as the ILE DE FRANCE, LEVIATHAN, BREMEN and EUROPA were shown by lantern slides.

This paper is of special significance at this time in calling attention to the importance of proper study of the interior decoration of ships. Though American architects and interior decorators have a high standing in their art, ships' interiors in this country have sometimes been executed without the benefit of a properly accredited architect or interior decorator. Mr. Etter in his paper points out the danger of too sudden and too wide a departure from conservative lines. The "art moderne" does not appeal to him. He does, however, insist upon the necessity of co-operation between the artist and the naval architect.

A number of interesting discussions were presented serving to bring out the common sense and good busi-

ness of using care and skill in the decoration and furnishings of the new American passenger ships now under construction and projected in the United States.

9. *Modern Geared Turbines*, by C. R. Waller, member.

The author is chief engineer, De Laval Steam Turbine Co. It is the purpose of this paper, in the words of the author, to set forth some of the outstanding results of the last ten years of development and to outline from present day practice and experience the modern geared turbine. The paper deals with the impulse type of turbine which is the type manufactured by the company of which the author is chief engineer. He sets down a number of general requirements for a turbine to be applied to ship propulsion as follows:

1. The turbine must operate in either direction.
2. Transmission from high speed turbine to low speed propeller.
3. Turbine and gear must be designed for ready installation in the ship's structure.
4. Reliability of service.
5. Simplicity of operation and maintenance.
6. Efficiency in performance.

The question of standardization is taken up and it is suggested that standardized sizes of propelling units have not been worked out due to variations and conditions involved or due to the fact that no effort has been made to formulate specifications and requirements. Suggestions are made for specifications and requirements for a double geared compound turbine propulsion unit. The arrangement, steam condition, rating, water rate, turbine construction, gear reduction and couplings are all covered in this paper under the general specifications. Much data and information are given in tables and charts for the impulse type of turbine.

A lively discussion developed. Several of the speakers voiced their appreciation of the great deal of data and useful information presented in the paper. In some instances the speakers disagreed on certain points like on the necessity of polishing the tooth surfaces of gears. The main disagreement on the paper was the point made by W. E. Thau, director of marine engineering of the Westinghouse Electric & Mfg. Co. who stated that the title of the paper should be changed to read in effect "Modern Geared Turbines According to De Laval Practice." The point being that otherwise there might be a chance of misunderstanding since the specifications and rules and regulations laid down naturally fit this particular type of turbine and gearing.

10. *The Variable Pressure Water Tunnel of the U. S. Experimental Model Basin*, by Commander Harold E. Saunders (CC), U.S.N., member.

The author is attached to the experimental model basin, Washington. The paper describes the use of the water tunnel at the water basin for the study of cavitation. The author points out that after 35 years of study little has been learned of the nature and characteristics of this phenomenon. The problem of overcoming it still remains and it is particularly exasperating as it is directed against subduing an antagonist that cannot be seen.

The apparatus used at the model basin for conducting these experiments has been designed for the purpose of permitting the study of cavitation at close range. In the concluding paragraph it is pointed out that cavitation is not confined to propeller blades, but that it does occur also around the hubs, shaft struts and in the wake of full bossings, behind plate laps and in the vicinity of condensate scoops. Much of the severe vibration ascribed to the propellers may easily be due to improperly executed and incorrectly placed struts and bossings. A study of these problems is possible by the use of the water tunnel. Several discussions were presented including one from G. S. Baker, superintendent of the William Froude National Tank at Teddington, Eng.

11. *The* 10,000 *ton Treaty Cruisers with Particular Reference to the Salt Lake City and Pensacola*, by Rear Admiral George H. Rock, (CC), U.S.N., vice president.

The author is chief constructor of the navy. His paper incorporates the actual performance of the SALT LAKE CITY which was the first ship of the new line of cruisers. The SALT LAKE CITY and the PENSACOLA were designed in 1925 based on the Washington treaty. The results of the trials increased confidence that the vessels of succeeding classes will possess the qualities predicted. It also gave data of great value for the designs not yet taken in hand. Formerly naval designers like merchant ship designers generally attempted to obtain the qualities sought for in a ship with minimum displacement, but if the displacement increased over the figure set the condition was usually accepted as of no great moment except as a matter of cost. The treaty turned this whole situation upside down, the qualities no longer first with the size of the ship secondary. Now the ship as a whole comes first and in this fixed amount of ship it was necessary to get the best combination of qualities. There was a decided feeling of international competition, a rivalry to produce the best results.

The primary problem became one of saving hull weight, but at the same time to make the ships strong enough for the work intended.

The trials of the first of these cruisers prove that great reductions in weight can be made without sacrificing good qualities generally. It seems almost that there is no limit to the progressive savings which can be made. It has been shown conclusively that, with careful design and construction ships can be built to the comparatively moderate limiting displacement and yet possess outstanding military qualities combined with hulls and machinery of strength and reliability. Numerous interesting illustrations accompanied Admiral Rock's paper, which was received with great interest.

12. *Thrust Measurements on the S.S. Clairton*, by R. R. Adams, visitor.

The author was former technical assistant, bureau of construction, United States shipping board. This paper is intended to answer the question left open in the presentation of the paper last year on *Model and Full Size Test of a Single Screw Merchant Vessel.* That question was whether the discrepancy between model and ship performance should be attributed to erroneous frictional coefficients or to failure of the ship's propeller to attain the efficiency of the model propeller.

In conclusion the author states that the trials in a sense support the methods and coefficients now in use by the navy model tank in estimating the resistance of ships. At the same time the evidence supports the conclusion that the estimates of ship performance from model tests as they now come from the Washington tank will be borne out by ship trials only when such trials are conducted in a smooth sea with no wind. In this way accurate powering of new ships for a given sustained sea speed in a given run may be accomplished.

13. *Tests of Model Propellers of Various Blade Sections*, by Rear Admiral David W. Taylor, (CC), U.S.N., retired, past president.

Like all of the valuable contributions of the author to the transactions of the society, this paper is succinct, clear, and to the point.

It covers a research into the question of blade section. Five groups of propellers, each group containing four models of different pitch ratios were tested. The standard mean with ratio and blade thickness fraction were respectively .25 and .05. The results as regards efficiency are compared with the results from a group of ordinary ogival section models tested last year. It was found that four of the new groups tested with sections departing from the ogival indicated a somewhat greater efficiency over the practical range. One group showed distinctly less efficiency. The five groups of eight-inch models of sections departing from the ogival were tested in the twelve-inch jet of the new variable pressure water tunnel. They all showed cavitation when the pressure around the jet was sufficiently reduced and there was no

(*Continued on Page* 62)

# Turn Around of a Liner at New York

## Quarantine—Immigration—Customs—Docking—Discharging Passengers and Cargo—Taking on Fuel, Water, Stores, Cargo and Passengers—Careful Planning Required

By James G. Bisset

THE time spent in port by an ocean liner, between trips, is usually known as the "turn around." It may be a quick "turn around," say, twenty-four hours, or an ordinary "turn around" of four or five days, but whatever the duration, the same formalities and procedure have to be gone through, but at a different tempo. Let us consider briefly, the ordinary "turn around" of a great Atlantic liner, from the time she drops anchor at quarantine on her arrival at New York until she passes Ambrose channel light vessel a few days later, outward bound.

The first persons to board the ship at quarantine are the port medical officer and his assistants. They examine the bills of health carried by the ship, which show the health conditions prevailing in the countries she has left, in this case, England and France. They examine all third class passengers and get statements signed by the captain and ship's surgeon declaring that there are no infectious or suspicious cases on board. Being satisfied that all is in order, the Port medical officer grants "pratique." This is an old French word, meaning, "permission given to a ship that has satisfied health regulations, that she may hold intercourse with the port."

During the time the doctor has been on board the mail tenders have ranged alongside, port and starboard, having been warned several hours before by radio of our expected time of arrival at quarantine. Within a few minutes, chutes and "save all" nets have been rigged, and the mail bags begin to pour into the tender at the rate of about 5000 per hour. The weight of mail bags is estimated at 50 to the ton. Before arrival at quarantine the mail has been sorted into two lots; New York and environs on one side, and bags for railroad transportation on the other. As the bags go on to the tender, large gangs of men sort them into more particular groups as they stow them away, so as to facilitate dispatch on reaching the post office. Immediately pratique is granted, the immigration officials and customs boarding officer come on board and the medical officer leaves. The duty of the immigration officials is to see that no unauthorized persons land on American territory. Passenger manifests are prepared.

Passenger manifests are divided into two groups as follows: Form number 630, for United States citizens. This gives full name, age, married or single, whether natural born, and if so, place of birth, or if naturalized citizen, name of place where naturalized; date and name of court where naturalization took place, and permanent address in the United States. Form number 500 for aliens. This consists of thirty-six questions which have to be carefully and accurately answered and typed in. Failure to give correct and proper information on these forms may result in heavy penalties. The information required is as follows: Full name and last permanent address; age; sex; married or single; calling; able to read and write; nationality; race; place of birth; immigration vise number and date and place of issue; name and address of nearest relative in country just left; final destination; whether holding ticket to such place; who paid for ticket; whether in possession of 50 dollars, and, if less, how much; whether ever been in United States before and when; whether going to join relative or friend; if so, the name and address; purpose of coming to United States; length of time intending to stay; if intend to become citizen; whether ever been in alms house, insane asylum or charitable institution; whether a polygamist or anarchist; whether believes in or advocates the overthrow by force or violence of the government of the United States, or all forms of law; whether coming to United States by reason of any offer, solicitation, promise, or agreement; whether alien has been previously deported, within one year; condition of health, mental and physical; deformed or crippled, nature and cause of same; height, complexion; color of hair and eyes; marks of identification.

In addition to preparing these manifests, the vises of all passengers have to be arranged and classified into the following groups: non-immigrants, immigrants, nonquota, quota, quota preference and quota nonpreference. These categories are further subdivided into 19 other groups covering such cases as "a bona fide student entering the United States for a period of special study," or "a child born of United States parents in a foreign country," etc. From the foregoing it will be appreciated that a good deal of labor is entailed in gathering the various details, and a fairly complete knowledge of the immigration laws is required for their proper arrangement and classification.

Another manifest has to be prepared before arrival, embracing the crew, who of course, in a British vessel are all aliens. This manifest is known as form number 680 and requires the following details: Name; age; sex; height; weight; race: length of sea service; rank in ship; when and where person is engaged; identification marks; whether in the ship on her last voyage, and whether able to read and write. Members of the crew are not required to carry passports, but this manifest forms one large passport which is vised by the American consul at the port of signing. On arrival at New York every member of the crew must pass before an immigration official who quickly examines the details

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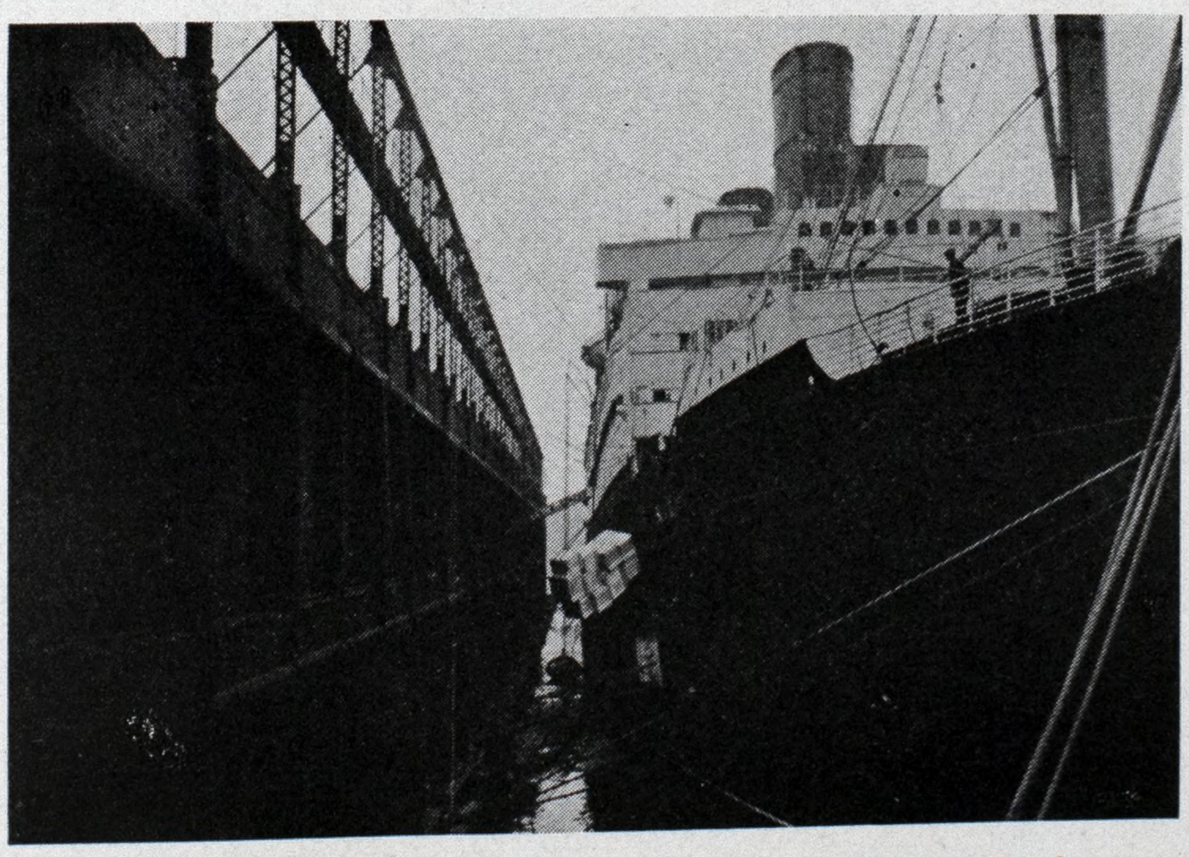
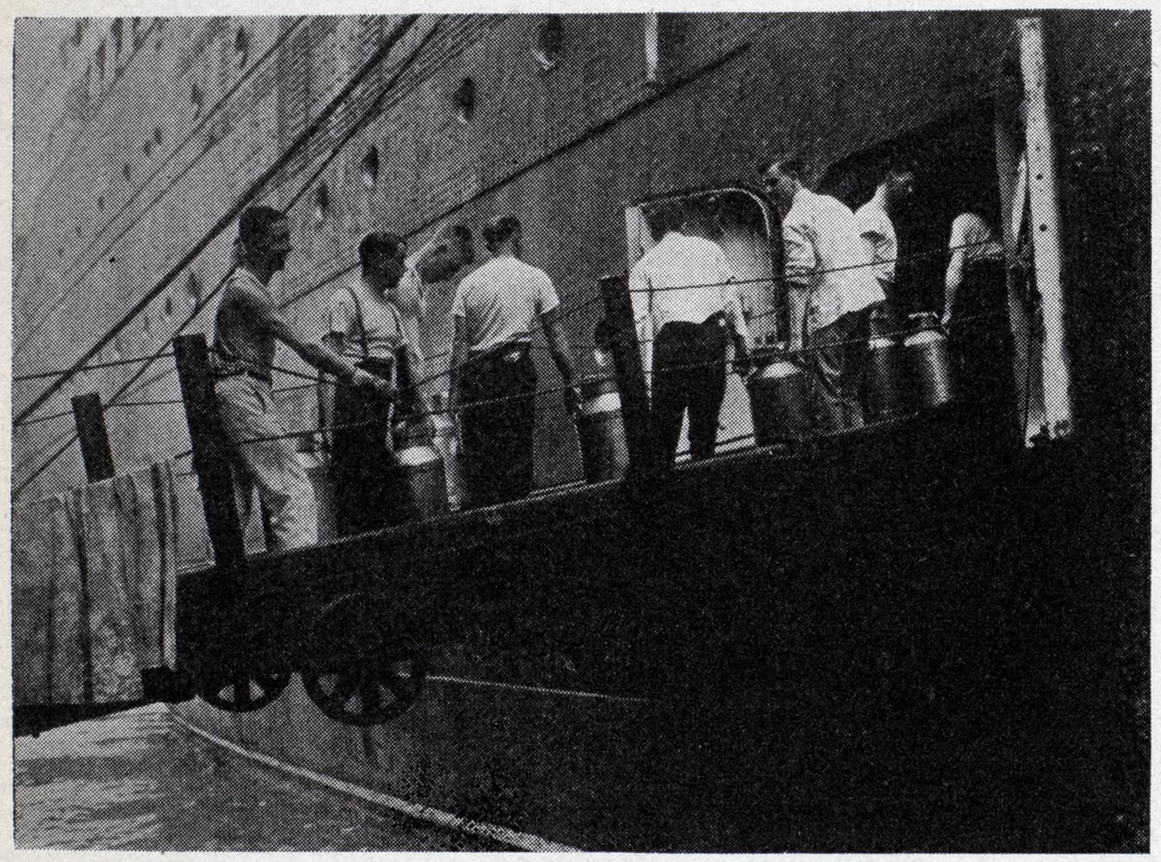
The author, Commander J. G. Bisset, R.D.R.N.R. is chief officer of the R. M. S. Berengaria. This article was especially prepared for Marine Review at the request of the editor.



*Cunarder Berengaria Moored to Dock at New York*

and ticks him or her, off on the manifest after which they are allowed to go to and from the shore at will during the vessel's stay in port.

The usual procedure of the immigration officials on boarding the vessel at quarantine, is to commence with the first class passengers, taking United States citizens first. The passenger presents his "landing card" which has been issued to him during the voyage by the purser, together with his passport. If these are all in order, the official stamps the "landing card" and this is collected at the gangway as he goes ashore. This procedure is carried out in other classes, in order, American citizens being examined first in each case, after which concentration is made on remaining alien passengers who are admissable without going to Ellis Island. Broadly speaking, nowadays, all passengers may be examined on board the steamer excepting quota passengers, that is, immigrants, travelling third class, who must, according to existing regulations, be taken to Ellis Island.



*Shore Gang Handling Milk Cans On The Cunarder Berengaria at New York. Two Thousand Gallons of Milk Are Taken On Board. One of Many Items In Stores Sufficient For Need of Nearly 1000 in the Crew and a Large Passenger List*

In addition to the above, six copies of the cargo manifest must be prepared before arrival, giving full description of the cargo, marks and numbers, consignees, shippers, etc. A very important adjunct to this manifest is a list of all surplus food and liquor stocks remaining on board on arrival. The dutiable stores, including all liquor, is sealed up by the customs officials.

After the mail is discharged the ship proceeds to her berth or pier in the North river. During the passage, the immigration officers carry on with their examination of passengers and crew, and the customs boarding officer checks over the cargo manifest. Having certified this manifest, the captain having "sworn" to its correctness, the boarding officer delivers a "preliminary permit" which allows the ship on reaching her berth to commence discharge of passengers, baggage and cargo, immediately. Without this permit it would not be possible for the ship to commence discharging until the captain had visited the custom house and "entered" the ship, and this, of course, would lead to considerable delay and disorganization.

Later, when the ship is snugly in berth, the captain visits the custom house and "enters" the ship and on this occasion must produce the ship's register, tonnage certificate, light dues certificate, certified copy of cargo manifest, pratique certificate, original copies of all bills of health, list of surplus stores and two complete lists of passengers and crew. The captain also calls at the office of the British consul and deposits the ship's "articles."

As she approaches the vicinity of the pier, the ship is turned if necessary, as it is quite impossible to dock one of these large liners unless they are stemming the tide. When she is in this position, and about seventy yards from the end of the pier, a fleet of 10 or 14 tugs get into position at the bow and stern. The forward tugs act as "pushers" and each one sends up a four inch manila line to the vessel's forecastle head to assist in keeping them in position. They have large rope fenders or bow mats over their stems so that when pushing the pressure will be distributed over two or three of the ship's frames, thereby avoiding denting or possible fracture of the shell plating. The stern tugs cannot be used in this way owing to the strong wash from the ship's propellers, so they make fast aft and tow in the ordinary way, using the ship's nine inch manila lines for tow ropes, with a scope of about 450 feet on each. These ropes are each 110 fathoms long and have a breaking strain of roughly 50 tons. When two or three tugs have got their ropes and are in the towing position, other tugs will then make fast ahead of them if required, so that several tugs may pull on the same rope, in line ahead.

When the tugs are all fast fore and aft, the ship is "angled" slightly across the tide, and using her engines to keep her in position, the tide slowly but surely presses her huge bulk down towards the end of the pier, the tugs meanwhile acting on signals from the captain or pilot, and pushing or pulling as required to prevent her from taking the pier too hard. The slighter the angle she is given across the tide, the easier she will drop alongside, and conversely, the weaker the tide, the more angling she will require to enable the tide to do its work. With a flood tide she has to turn and come to rest on the pier above her own, and with an ebb tide she rests on her own pier. Where she takes on the end of the pier is known as the knuckle, and this part is protected with a heavy, floating wooden fender about 20 feet long and two feet wide which is free to adjust itself to whatever angle the ship takes.

### Warping Alongside of Pier

Having got her gently on to the knuckle, with her nose pointing slightly into the dock, she is allowed to rest there for a few minutes while the bow tugs cast off and get round to the other bow. They are now in place to give a slewing motion to the ship. All being set, the ship's engines are worked ahead on one side and astern on the other and with the tugs working like Trojans, she slowly squares up and slides into dock and alongside her pier.

Marks are fixed on the side of the dock shed about level with the bridge, showing exactly where the bridges of the various ships must be when they are correctly in berth. It is necessary to be exact in this matter, as the moment the word is given, six passenger gangways, four baggage gangways and two baggage escalators are placed in position on the upper and lower decks of the shed, and disembarkation commences. When this is completed all these are removed except one gangway on the top shed for officers and visitors, and one on the lower shed for crew and laborers, also a store gangway.

In berth the ship is moored with nine inch manila hawsers and five inch wire ropes. Owing to the height of these liners above the quay, it is necessary to give the moorings a good fore and aft spread and to avoid short nips. Three wooden pontoons about 12 feet wide and 20 feet long are moored between the ship and the quay. These are to prevent the ship touching the shed should she at any time list inshore. At the top of the first high

water after docking, the moorings are adjusted so that they are all tight and bearing an equal strain. Then they will remain correct till the ship begins to get deeply loaded or till spring or neap tides demand further readjustment.

The heavy mooring winches, capstans and engines for manipulating the lines, must perforce be on the upper decks, which means, as previously mentioned, that the moorings must come in over the upper deck fairleads and are consequently high above the quay. To avoid this in some cases, long narrow iron mooring pipes are constructed in the ship. These start from some convenient position near the capstans, and emerge on the ship's side about 12 feet above the water line. On approaching the dock, the ropes are lowered down through these pipes and allowed to hang near the water's edge so that the mooring boat can pick them up. The pipes of course are water tight and at sea the water sweeps into them at will when the ship is pitching heavily.

The great objection to high moorings is that no matter how taut they may be at high water, they are apt to be very slack at low water and the ship is then liable to drift off the quay and possibly drop the gangways in the "ditch." Under all circumstances it is wise to keep a strict watch on the moorings, and it is a good plan for the gangway quartermasters, whose duty it is to keep an eye on the moorings, to have a small blackboard at each gangway showing the times of high and low water during the ship's stay in port. Thus they can materially assist the officer of the watch. These boards are prepared before arrival by the navigating officer.

### Begin Taking On Oil Fuel

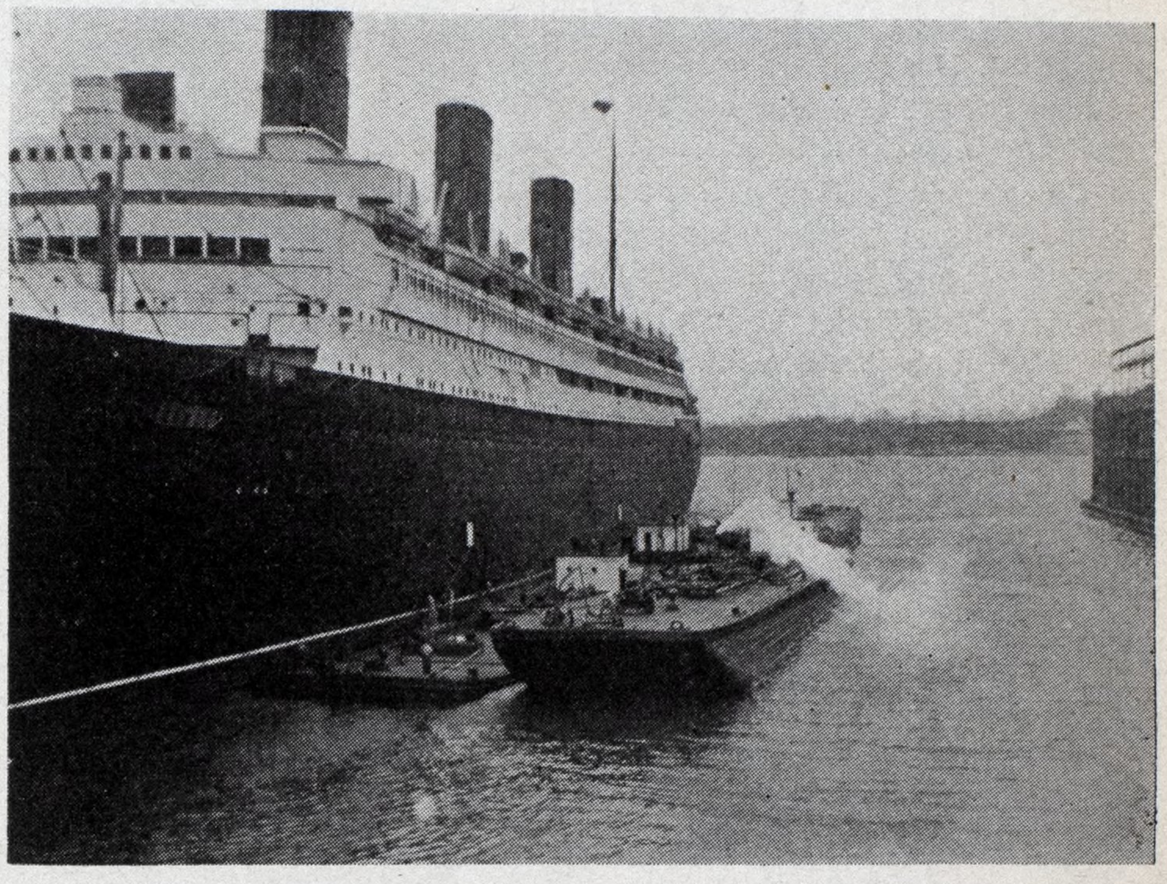
Within an hour of berthing, oil fuel barges are alongside and connected up to the ship's filling lines with a 12-inch flexible pipe. Oil fuel can be pumped in at the rate of 400 tons per hour. During the voyage, certain oil fuel tanks when empty, have been refilled with salt water for stability purposes. These are now pumped out through separators, so that the oil is saved and only perfectly clean water discharges into the dock. These separators can handle about 200 tons per hour. At the same time six hoses are connected with the shore and fresh water is run into the double bottom tanks at about 150 tons per hour. As with the oil tanks, several of the water tanks have been filled with salt water at sea for stability purposes, and these have to be emptied and filled with fresh water several times in order to get them perfectly fresh. Water for drinking and cooking is carried in specially constructed tanks and these are never, on any account, contaminated with salt water.

On the largest liners the average consumption of oil fuel is about 750 tons per day, and fresh water 500 tons per day. All this pumping out and filling of water and oil must be carefully controlled so that the ship retains ample stability throughout the operation. A list one way or the other seriously interferes with the handling of cargo as the hatch ways are anything from 60 to 70 feet deep. To obviate this, a set routine of pumping and filling is worked out by the chief officer and chief engineer: This routine is rigidly adhered to, and the slightest sign of a list is immediately corrected by special wing trimming tanks, reserved for the purpose.

Turning to the more domestic side of the ship's work, one of the first duties of the catering department is to get all the soiled linen ashore to the laundry. In the largest ships about 60,000 pieces are laundered in New York and double that amount in England. Landing this quantity and carrying it on board again and distributing it to the various linen lockers throughout the ship is no mean task. Taking in stores is another heavy job for the stewards. Such lots as 25 tons of ice, 15 tons of potatoes and other vegetables, 2 tons of fish, 1 ton of groceries, 1 ton of ice cream, and 2000 gallons of milk and cream are just a few of the items. The fact that nearly 1000 individuals in the crew have to be catered for with three meals a day must not be lost sight of.

Every cabin in the ship must be scrupulously cleaned and made ready for the reception of the next batch of passengers. Washing and holystoning of decks, painting of ship, cleaning of holds, baggage and mail rooms, upkeep of boats and life saving gear, is done by the seamen who work under the direction of the boatswain and first officer. The engine room department, besides filling oil fuel and fresh water tanks, makes a general overhaul of machinery and carries out whatever repairs may be necessary. This also includes plumbing and electrical repairs throughout the ship. At some convenient time the whole ship's company is exercised at boat drill. All boats are swung out and a number lowered to the water and the crews trained in pulling and sailing and the use of the boat's equipment. Fire drill is also carried out and a thorough test and inspection is made of all fire fighting apparatus.

All cargo work is carried out by shore stevedores under the orders of the freight superintendent with whom the chief officer is in constant consultation with reference to distribution, stowage, and general trim of the ship. The stevedores also handle hold baggage, mails (loading only) and passengers' uncrated motor cars which are stowed in a separate compartment known as the garage deck.



*The Berengaria Taking On Oil Fuel at New York—Within One Hour of Berthing Barges Are Alongside and Begin Pumping In Oil Fuel At the Rate of 400 Tons Per Hour. Consumption of the Largest Liners is About 750 Tons Per Day While At Sea*

Watching cargo, mails, baggage, specie, etc., is carried out by the ship's inspectors working under orders of the chief officer. These inspectors are mostly retired policemen and since their introduction into the ships a few years ago, pilfering has practically been stamped out. At sea the inspectors carry out day and night patrol duties and help to preserve order and decorum among passengers and crew.

Despite the amount of work being carried on, steps are taken to provide sports and recreation for the crew. This is looked after by an organization usually known as the social and athletic club. A committee of officers and men make themselves responsible for the club's activities and during the voyage out, a program is drawn up for each day in New York. Football and cricket matches, motor coach trips, dances, boxing, talkies, whist, bridge

(*Continued on Page* 64)

# Huge Dredge Sails on First Voyage

## Turbine Electric Hopper Dredge and Self-Unloader J. R. Sensibar—Can Unload Dry Bulk Cargo—Largest Sand Sucker—Pulverized Coal Burner

By A. H. Jansson

A GREAT industry has grown up around the lowly task of moving sand, gravel and stone and in making solid dependable ground out of marshy low lying bogs or in building new shore land on lake and sea. It is not an old industry and its rapid growth is one of the romances of the ever swiftly moving development of machinery in America to multiply a thousand fold the labor of an army of men.

About 19 years ago construction commenced on the Field Museum of natural history on the lake front at Chicago. The foundations could only be made secure by a solid fill and the only practical method semed to be to use tamped sand. But how was so great a quantity of sand to be brought to the site and properly distributed within the limits of a reasonable cost? By equipping an old wooden steamer the L. L. BARTH so that she could pump sand from the lake bottom at a convenient location 40 miles away and bring it to the lake front at Chicago discharging the material by pumping exactly where needed over the 11 acres area, J. R. Sensibar laid the foundation of an industry. From that day to this there has been a remarkable expansion of its activities.

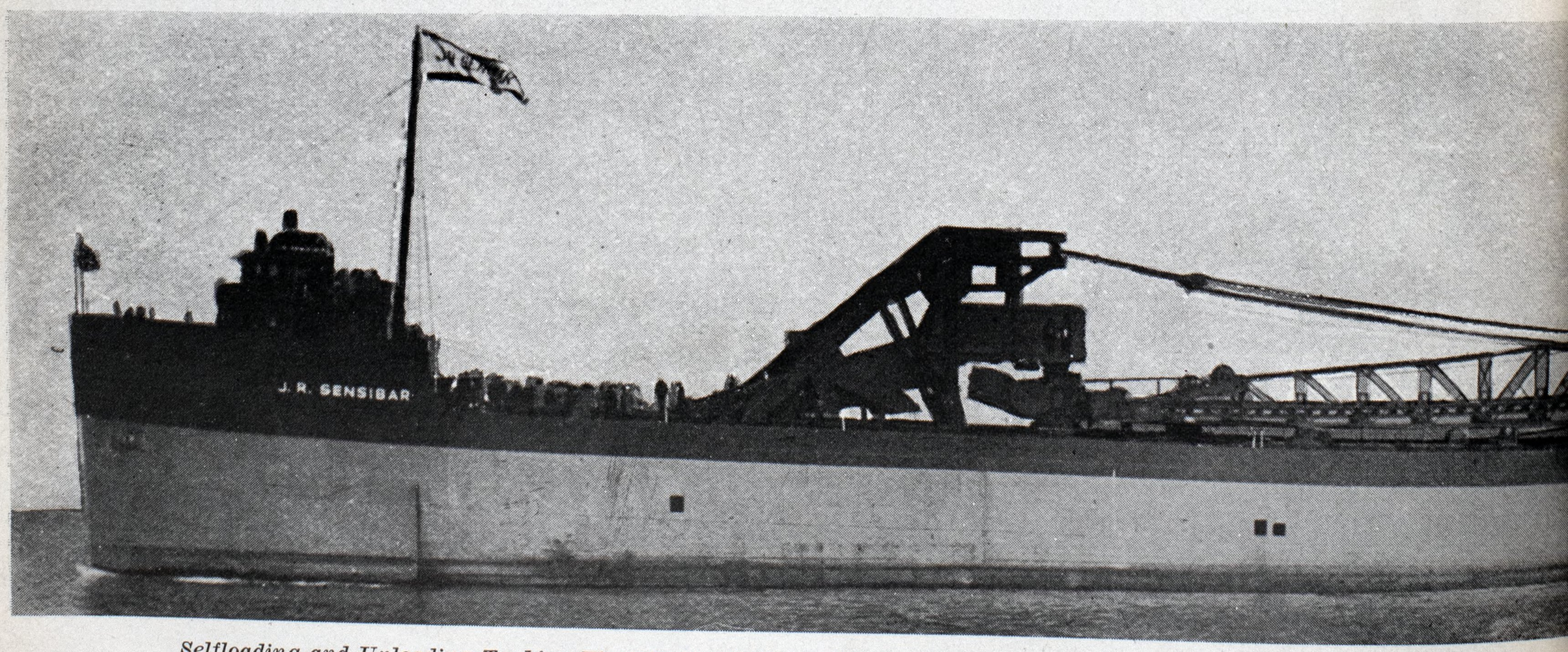
It has been found that sand fills of this nature compress the ground not alone by its own weight but by hydraulic means in draining off and that so made it will support enormous loads. The compacting of the fill by the four to eight tons of water with each ton of sand makes an exceptionally solid foundation even of the soil below it. This process will give required contours exactly and eliminates excavations. back fills and grading. An accuracy of from two to six inches is possible in areas of 100 acres. Ultimate settlement is immediate and building can commence within 5 minutes of completing the pumped in fill. Ground so made will have a carrying capacity up to 31,000 pounds per square foot without any footings or underpinnings of any kind.

With years of research and practical experience it is now possible to predetermine accurate estimates on the bearing properties, slopes, elevations and ultimate levels of any given area. Savings in construction work foundations and land more than offset the cost of making fills.

### Wide Scope of Application

It may be interesting to describe briefly some of the important work completed or underway by the Construction Materials Co. The entire plant site of the Great Lakes Steel Corp. at Ecorse, Mich. an area of about 200 acres is being filled from 10 to 35 feet in depth with material brought from a distance of 36 to 60 miles. Material brought 50 miles was used to make a fill on an average of 12 feet deep over an area of 30 to 40 acres at the plant of the Newton Steel Co. at Monroe, Mich. Several million yards of fill was made to a depth of from 10 to 40 feet at the plant of the Youngstown Sheet & Tube Co., Indiana Harbor, Ind. At Buffalo a pier 350 feet wide by 1200 feet long was filled in to a depth of from 10 to 20 feet for the Terminals and Transportation Corp. of America. About 40 acres were filled to a depth of from 9 feet to 43 feet at the site of the Continental Motors Corp., Muskegon, Mich. At Waukegan, Ill., a fill was made for the Johns Manville Co. covering 57 acres averaging in depth from 4 to 15 feet. One of the largest projects is the lake front development for the South Park commission, Chicago. The total area is over 600 acres of which this company did a large part and practically all of the contour work. The fill in this case was from 7 to 57 feet in depth including hills and slopes up to 43 feet above lake level and with slopes as steep as two horizontal to one vertical.

To carry on this important growing industry costly equipment and machinery has been developed by the engineers of the Construction Materials Co. under the leadership of J. R. Sensibar, president. The latest and most elaborate unit is the recently completed turbine electric hopper dredge and self unloader J. R. SENSIBAR. This vessel converted from a bulk freighter at a cost of nearly $2,000,000 fully equipped is the largest sand sucker as well as the fastest dry cargo self unloading vessel in the world. A complete description of this unique ship will follow. In addition to this vessel the company's




*Selfloading and Unloading Turbine Electric Single Screw Hopper Dredge and Bulk Cargo Carrier J. R. Sensibar Complete*

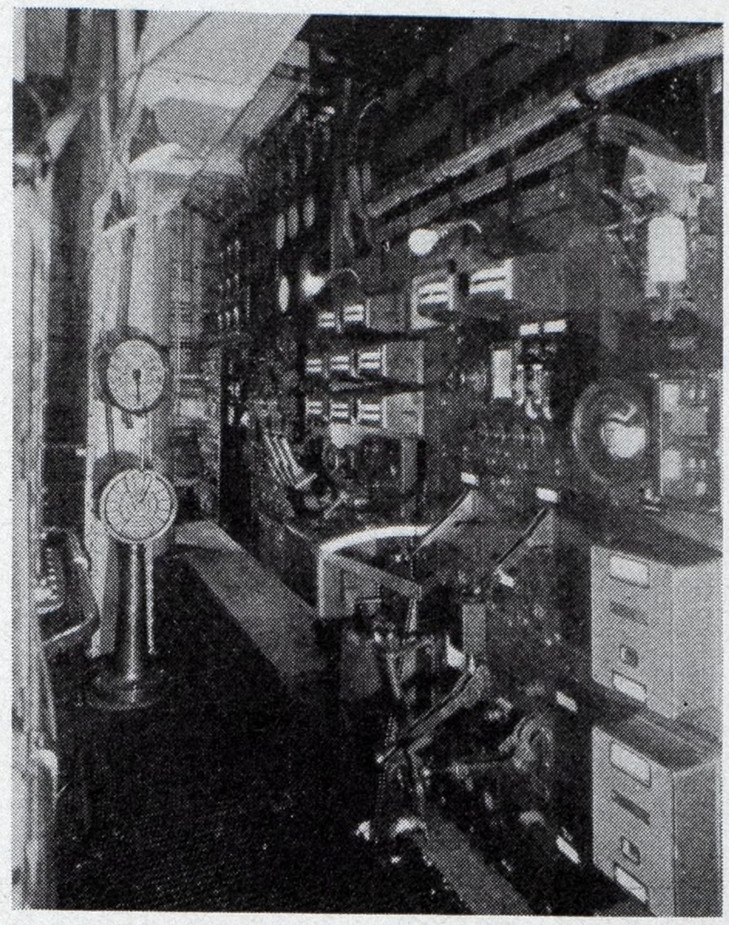
fleet now consists of four other units; the SANDMASTER and SANCRAFT, modern hopper dredges, the AMERICAN, a sand sucker somewhat older and the FONTANA, a self unloader. The SANDMASTER, a diesel electric seagoing hopper dredge completed in May, 1926, was fully described and illustrated in MARINE REVIEW for June, 1926.

In the fall of 1929 the bulk freighter FRANK C. BALL was purchased from G. A. Tomlinson, Cleveland. By the end of December work commenced at the Lorain, O., plant of The American Ship Building Co. to convert this ordinary freighter into one of the most extraordinary special service vessels anywhere in the world. After months of complicated and special work the vessel had successful sea trials on Lake Erie, Nov. 10. On Nov. 13 she salied for Toledo where she took on a cargo of coal for Green Bay, Wis. From Green Bay she was to proceed to Sturgeon Bay, Wis., to take a load of stone to Chicago where she arrived Nov. 20.

She is by far the largest hopper dredge on the Great Lakes and as far as known, in the world. Her length between perpendiculars is 530 feet; molded beam, is 56 feet and the molded depth is 31 feet. The hoppers have a capacity of 274,600 cubic feet or 10,000 cubic yards. Her carrying capacity on a draft of 21 feet 1½ inches is 10,000 tons (2000 pounds to the ton).

Steam turbine electric drive, pilot house control, boilers burning pulverized coal, streamline rudder, rubber stern bearing of the largest size in operation, are a few of the modern features of this unusual vessel. This ship is equipped with the J. R. Sensibar method of loading and unloading cargo; methods and units patented and patents pending.

She is said to be the fastest bulk unloading plant either afloat or ashore. Maximum rate of unloading will be 4500 tons of bulk cargo per hour, either wet or dry. She is two complete ships in one. She is designed to do everything that the latest and most modern dry bulk self-unloader can do and in addition she is fully equipped as hopper dredge for loading and unloading wet. She can serve in either capacity with equal ease and facility. This is something that has never before been tried as far as known and will have a tendency to double her value as a special unit prepared to do either kind of work.

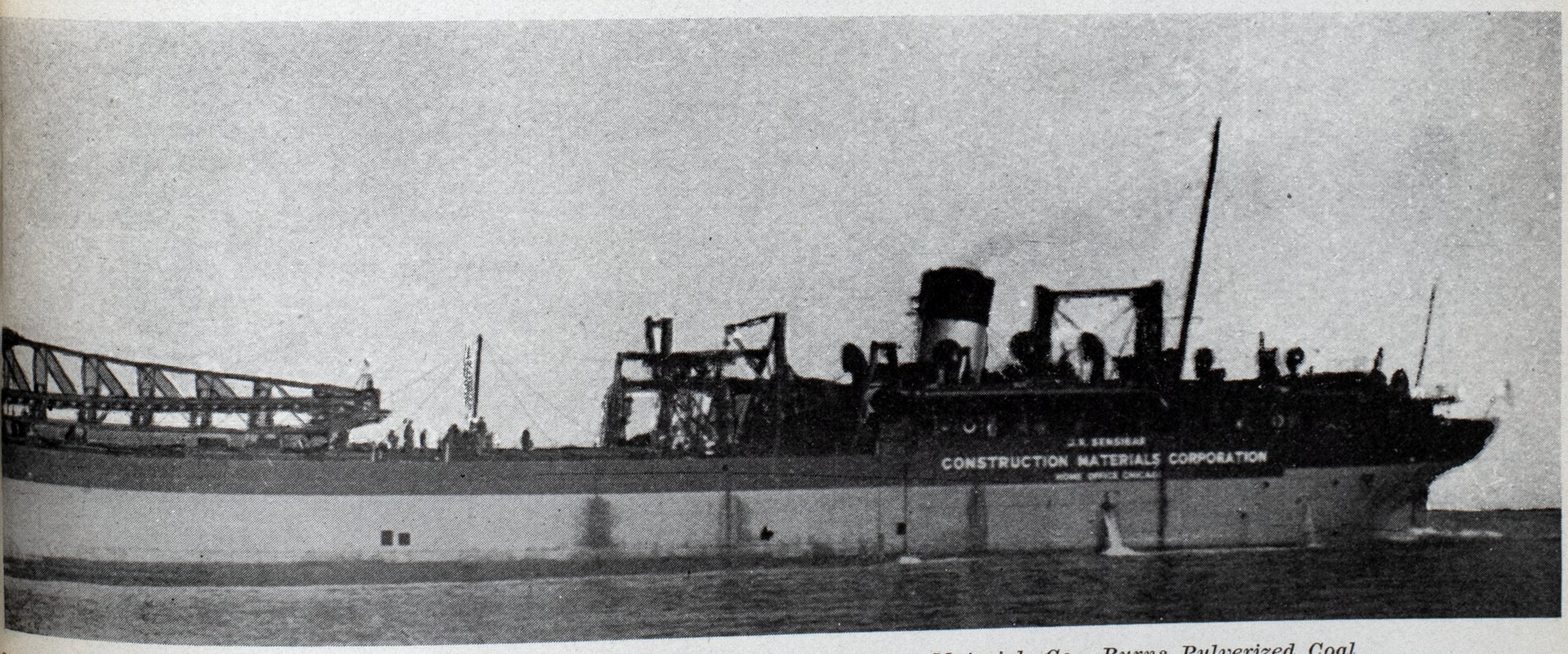


*Main Switchboard and Control Platform*

The original hull was literally gutted of all machinery. The hull is divided into five watertight compartments by four watertight bulkheads. Beginning forward the first of these bulkheads is at the fore peak. The next watertight bulkhead encloses the forward conveyor equipment. This bulkhead is also the forward limits of the cargo space. The cargo space is divided into three compartments transversely by two screen bulkheads and by a watertight bulkhead forward of the machinery space. Throughout the cargo hold is a continuous watertight centerline bulkhead thus giving port and starboard, fore and aft, six separate cargo compartments. The machinery space is aft and the fourth watertight bulkhead is at the after end of the machinery space or what might be termed the aft peak bulkhead.

The cargo spaces on both sides of the fore and aft bulkhead are plated watertight in the shape of hoppers coming down to a flat about 3 feet wide and a little over 7 feet above the bottom shell of the ship. The original tanktop which was 5 feet deep is recessed to 30 inches in depth over the base line under the hoppers to make room for the hold conveyors.

This then is the general structural arrangement of the ship. We have now to consider the two distinct purposes of this vessel. First, as a self loading and self-unloading hopper dredge or as it is commonly called as a sand sucker. The sand pumping equipment includes two 30-inch centrifugal dredge pumps located one on each side in the engine room. Each pump is driven by two 750-horsepower alternating current motors, three phase, squirrel cage, 50 cycle, 2300 volts. These motors are connected to the impeller shaft of the pump through disk thrust bearing and Falk couplings. One of the unique features in this drive is the automatic arrangement throwing in the second motor when the power exceeds that of one motor. This makes a more flexible and economical arrangement than having a single motor of 1500 horsepower. These pumps are connected to 30-inch suction piping to the side of the ship. There are especially designed suction hoods for use when the vessel is taking sand over an area where the depth of the sand is only a few feet. The vessel proceeds under her own power drag-




*Nov. 13, 1930, at Lorain, O., Plant American Ship Building Co. for Construction Materials Co.—Burns Pulverized Coal*

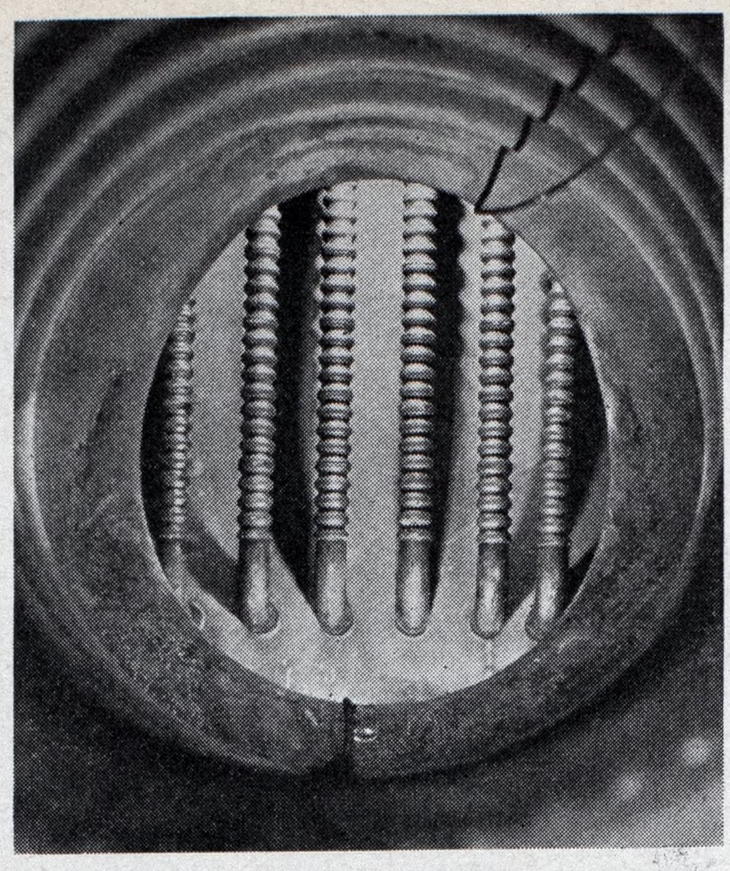
ging the suction hoods over the bottom. Another set of suction hoods are used when the vessel is loading in deep sand where she can come to anchor and load her entire cargo from one spot. There are, of course, suctions on both sides of the boat.

An interesting feature is the overboard suction piping which when not in use is stowed overhead on deck on specially built supports. These sections are handled by a crane. There is a grooved way on the side of the ship down which the square plate at the end of the suction pipes slides until it coincides with and covers the suction intake in the side of the ship. From this point the pipe swings down into the water until the hooded end comes to rest on the bottom. In this position everything is ready for the loading or pumping operation. The material, mixture of water and solid material in proportions of 80 per cent water and 20 per cent solids or thereabouts, goes through the pumps and the 28-inch discharge piping into closed flumes overhead which run the entire length of the vessel in way of the cargoholds, on each side under the deck level. These flumes are equipped with spouts and classifiers in way of each hatch for loading the proper size material into the respective hoppers and causing the oversize material to run back overboard. The amount of material going into each hopper can be easily controlled by closing the screens or classifiers with gates.

### Surplus Water Goes Overboard

As the water and sand rises, spillways take the surplus water overboard. The remainder of the water seeps through the drain troughs which are connected to jet pumps at a header aft.

When the vessel is completely loaded she can go to any port and discharge through proper lines by connecting the special discharge pipe arrangement on deck which is swung overboard and connected automatically to the shore piping. This special arrangement takes up the difference in the loaded and light load



*Radiant Type of Superheater in Back End of Boiler Looking Into Furnace*

condition of the ship; also any fore and aft or rolling motion of the vessel. The universal joints in this connecting piping makes it literally a flexible pipe.

The pumps are arranged so that either one may be used to unload the cargo or both pumps may be used in tandem. By placing the pumps in tandem it is possible to discharge a cargo of 10,000 tons in three hours through properly constructed pipe lines to a distance of four miles from the side of the ship.

### How Cargo Is Unloaded Wet

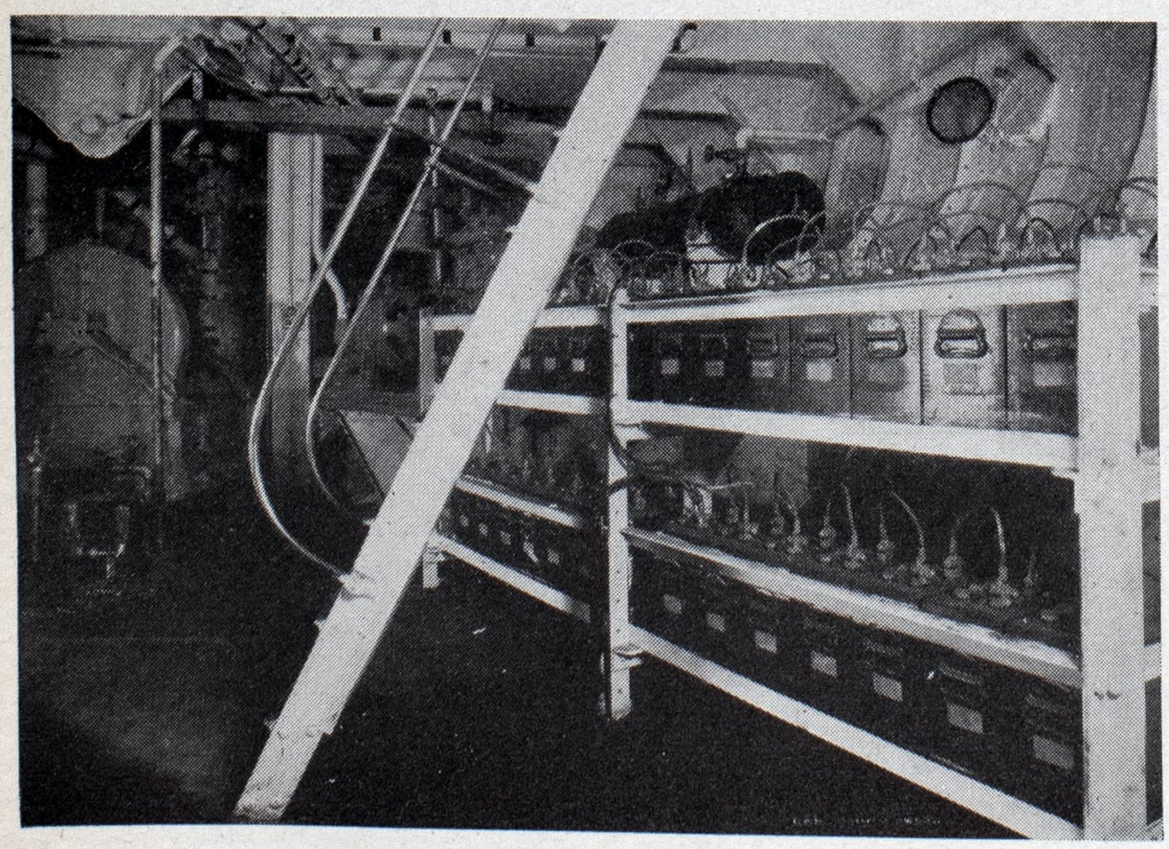
Unloading cargo wet begins from the top. Powerful jets are directed against the surface of the sand cargo and it is washed into wells or mixing chambers. The jet system is connected to two 12-inch centrifugal pumps each capable of delivering 5000 gallons per minute. As the sand is jetted into the wells or mixing chambers additional water from the sea is added in proper proportions for the discharge pumps to handle and thence through the discharge line to the fill. The main suction line is connected by branches to the wells. The suction and discharge valves are electrically operated by individual motors. There is a complete system of push buttom control for these valves. They may all be operated from the deck. Special signal devices show the exact position of each valve, whether open or shut or in an intermediate position. There are three of these wells for the after hold, three for the middle hold, and two for the forward hold. They are located on one side of the centerline bulkhead and are vertical.

A new and original feature of this vessel is the unique arrangements for dewatering the sand which is pumped aboard. Between the frames of the hopper construction on either side are especially designed screens which lead to continuous troughs running the full length of the ship. These troughs are connetced to a 16-inch pump which completes the operation by discharging this drained off water overboard. By the use of this system it is possible to so completely remove the water from the sand that it can be unloaded from the vessel dry by means of the belt conveyor system. After the excess water has run off in pumping cargo sand into the ship it still contains approximately 20 per cent of moisture. It is this last 20 per cent of moisture which is taken care of by the special dewatering system mentioned. Another important feature in connection with dewatering the sand is the saving in deadweight which makes it possible to load, for a maximum cargo at least 2000 tons more pay material on the same draft.

### Self Unloading Dry Cargo

Now we are ready to go on to the second distinct purpose of this vessel which is that of self unloading dry cargo. A complete conveyor system for unloading dry cargo is installed. There are two 48-inch conveyor belts running the entire length of the ship under the cargo hoppers. In the forward end of the vessel these two belts in turn feed two cross conveyor belts which deposit to one 60-inch inclined belt. This belt delivers the material to a hopper on deck which feeds to a 60-inch boom belt taking the material over the side on the dock.

Perhaps the most important feature in combining in one vessel, hopper dredge and dry self-unloading features is the necessity of alternately making the bottom of the hoppers watertight and providing openings so that the dry cargo can flow to the moving conveyor belt below. It is a difficult problem at the best and was solved in the case of this vessel by installing many watertight gates. These gates are of heavy structural steel reinforced with rail sections welded in place. The gates are 3 feet wide and 3 feet 10 inches long. There are 62 in each alley or 124 in all. Each gate is separately controlled by a specially designed arrangement of wedges and a rack and gear. It is possible to slack off each gate and to move it clear of the open-



*Willard Storage Battery Installation on the J. R. Sensibar Properly Stowed in a Structural framework in the Fantail of the Vessel. Batteries Safeguard Against Loss of Power for Vital Auxiliaries*

ing. Before loading wet cargo these gates are moved into position and then forced up by means of screw operated wedges on heavy rubber gaskets.

Material may be fed to the conveyor belt through the gates at the bottom of the hoppers for any particular compartment as may be desired and thus delivered on shore. Different types of cargo can easily be segregated in this manner. At maximum operation the speed and power of the conveyor system will permit unloading at the rate of 4500 tons per hour. The boom can place this material at a distance of 140 feet from the side of the vessel and to a height of 80 feet. All of the conveyor belts are operated with electric motors. These motors are controlled at various points on deck.

### A Frame and Boom

The A-frame, carrying the boom, is of heavy structural scantlings especially designed for a minimum height and a maximum swing for the boom. The overall height is only 28 feet. Most unloader ships with booms are able to swing them through a radius of not over a total of 180 degrees. In this vessel the boom can swing through an arc of 135 degrees from each side of the centerline or a total swing of 270 degrees. Putting it another way—this vessel is able to unload her cargo on the dock at a point abreast the stem of the ship. The A-frame is substantially constructed and the load is taken by back legs anchored by steel castings and pins with tie rods riveted to an arch construction below deck. The ship structure in way of the foundation of the A-frame is thoroughly reinforced by additional strength members.

The boom itself is 182 feet in length overall. Belt centers are 162 feet apart. A spill of 162 feet to a height of 80 feet above the water line is possible. About 21 degrees is the maximum incline for unloading stone and coal. The travel of the conveyor belts in the tunnels is about 450 feet per minute. The boom belt will travel 650 feet per minute. Fairly deep skirt boards insure a maximum layer of material on the belt.

We have now described the structural features of the wet and dry unloading; but there is also much of interest to engineers in the power plant on this vessel. The propulsion machinery is turbine electric of the type built by the General Electric Co. for the shipping board and installed in the ECLIPSE and INDEPENDENCE class of vessel. This consists of a General Electric turbine direct connected to a 3-phase 50 cycle alternating current generator operating at 3600 revolutions per minute at 2300 volts and 848 amperes. Current is supplied to one alternating current propulsion motor rated at 3000 shaft horsepower at 125 revolutions per minute. There are three accelerating points of speed control, 20, 40, 60 and 80 revolutions per minute, 40 cycles. Above 80 revolutions per minute up to 100 revolutions per minute, which is the normal load condition, the motor operates on 50 cycles. There is one new 750 kilowatt alternating current Westinghouse 3-phase, 2300 volts, 50 cycle, turbine generator which is also direct connected to a 75 kilowatt, 115 volt, direct current exciter as an auxiliary unit. The generator can be used as a motor in driving the 75-kilowatt exciter when current is availiable from the main unit.

In addition there is the usual 35-kilowatt reciprocating steam engine driven 115 volts direct current exciter which goes with the main propulsion unit. There are also two 10-kilowatt reciprocating steam engine driven generating sets for utility purposes.

One of the interesting features in the electrical equipment of the vessel is the large storage battery installation. There are two banks of Willard batteries having a capacity of 186 ampere-hours at the 8-hour rate at 120 volts. Each bank consists of 30 units, each unit is a four volt battery. These 30 units are hooked in series. The two banks are in parallel. The system consists of 120 cells of what is known as type K. T. W. S. 13 made by the Willard Storage Battery Co.

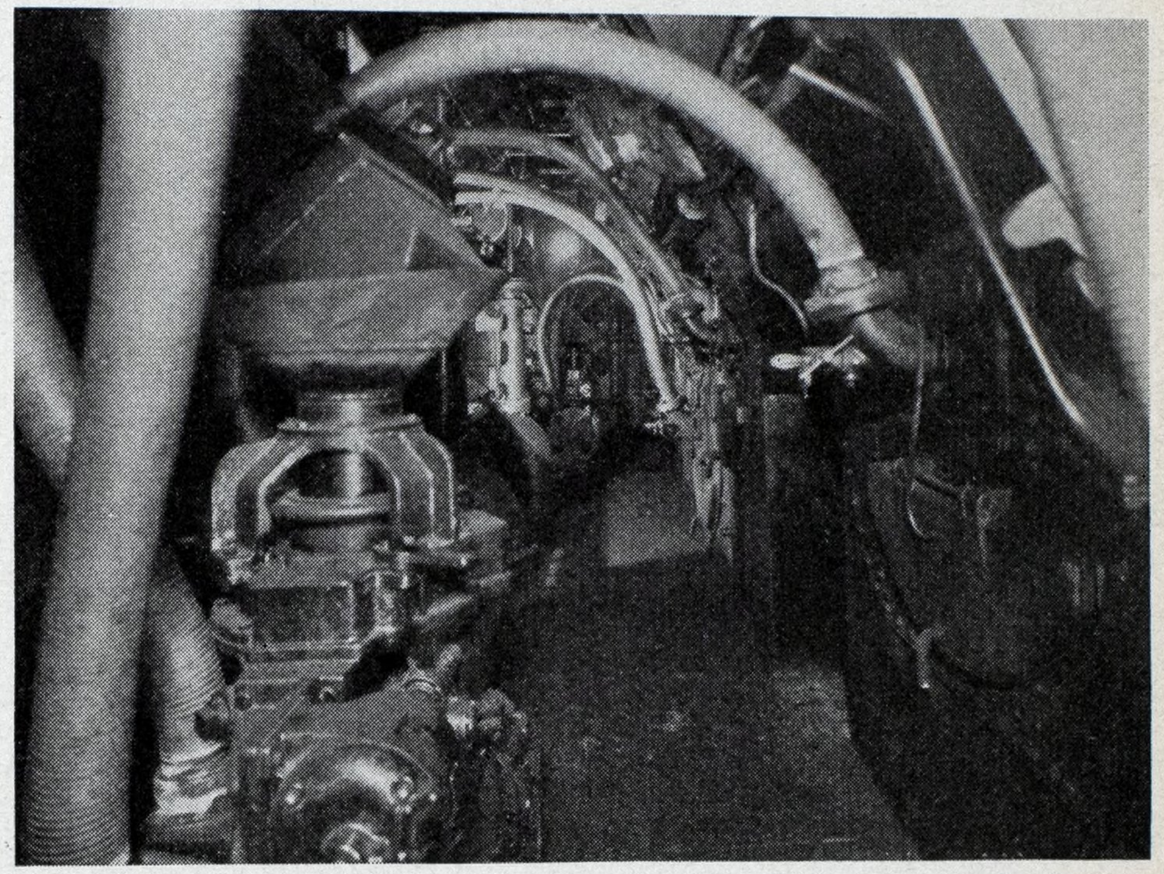
The storage battery installation serves all of the vital auxiliaries automatically as it is floated on the line at all times. Among the definite auxiliaries served are: Steering engine, emergency lights, pilot house propulsion control unit, induced draft fan, condensate pump, water circulating pump for the condenser, main motor ventilating fan; and finally the important service of excitation for the main unit is normally across the storage battery; should the regular supply fail the battery would perform this very necessary function automatically.

As noted above there are two 750 horsepower motors for each one of the large dredge pumps. Two powerful 12-inch centrifugal jet pumps are each driven by one 250 horsepower alternating current motor. A 25 horsepower motor drives the induced draft fan. A 16-inch centrifugal pump is driven by a 100 horsepower motor and two 6-inch centrifugal pumps are each driven by 25 horsepower motors. These three pumps are used for removing the water drainage which runs into one forward and two after sumps. The condenser circulating pump of 16-inch horizontal centrifugal type is driven by 50 horsepower motor. The main propulsion motor ventilating fan of Sturtevant make is also driven by a 50 horsepower motor. There are also numerous smaller motors for various services throughout the ship.

The small fuel oil pumps were furnished by Dean Bros. and the main lubricating oil pump and small hot well pump were furnished by the Union Steam Pump Co. Practically all of the electrical equipment except the main propulsion units and its immediate auxiliaries were furnished by the Westinghouse Electric & Mfg. Co. Crocker Wheeler Co. furnished three 30 horsepower 220 volts, 3-phase alternating current motors for driving the unit pulverizers of the pulverized coal installation through speed increases from 3000 to 3600 revolutions per minute.

Additional important motors furnished by the Westinghouse company of alternating current type, 3-phase, 2300 volts are: One 250 horsepower motor for the boom belt, equipped with a Crocker Wheeler brake; one 200 horsepower motor for the inclined belt conveyor; two 100 horsepower motors for the tunnel conveyor belts; two 20 horsepower gate motor mechanism; one 5 horsepower 115 volt direct current for the condensate pump forward; and one alternating current motor of 50 horsepower for the boom hoist.

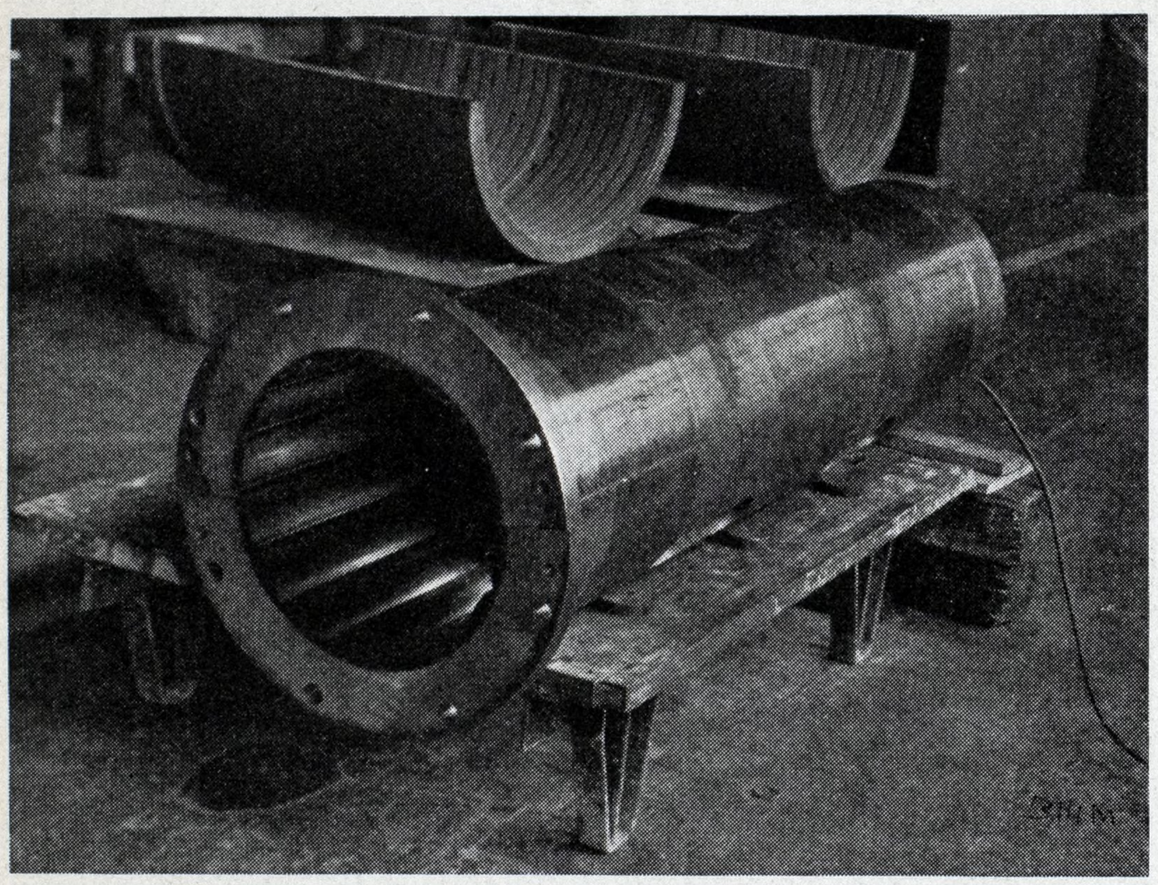
An important feature of this vessel is the system of piping with its valves and controls. A special arrangement has been worked out by



*Boiler Room of the J.R. Sensibar Looking From Port to Starboard, taken Oct. 20, 1930. Three Todd Unit Pulverizers Serve Three 3-furnace Scotch Boilers With Pulverized Coal. The Pulverizers are, in this case, Motor Driven.*

which, in the engine room or on deck, it is possible to tell at a glance the position of each valve, either open or closed. There are no less than 27 large motor driven valves furnished by the Michigan Valve Co. and fitted with Cutler-Hammer valve units consisting of motors and controls. There is one centralized valve control station in the engine room and one on the deck aft.

There are transformers on board to a total of 350 kilowatt capacity. This is for the purpose of transforming the 2300-volt current to 220 and to 115 volts. There are three 1000-watt searchlights and eight 500-watt floodlights furnished by Westinghouse. These lights provide ample illumination for efficient night work. There is an annunciator system between the operating wells and the engine room. This system has been worked out by the Connecticut Telephone Co. and the telephones were furnished by this company.



*Rubber Stern Bearing Known as the Cutlass Type for the J. R. Sensibar. Picture Taken in the Shop of the Goodrich Rubber Co. This Bearing is for a 15-inch diameter Shaft Which is the Largest Installation So Far Made*

A special and unique remote control system has been worked out on this vessel by the Benson Electric Co. By this system the propulsion motor can be started from the pilot house or from the engine room at will. The steering gear control is of the telemotor type and there is a rudder indicator showing the position of the rudder at all points.

For making steam there are three scotch boilers, two of them are 15 feet 9 inches in diameter and 11 feet in length; the third is 14 feet 6 inches in diameter and 11 feet in length. Working pressure for all the boilers is 180 pounds per square inch. The boilers are fitted with Ellis and Eaves induced draft and Foster superheaters.

In order to secure satisfactory steam conditions for the turbine generator set, it was necessary to have superheated steam and it was decided to adopt radiant heat superheaters as they are small, light and easy to care for in operation. These radiant heat superheaters are placed in the combustion chamber. There are two horizontal headers placed at the backs of the boilers and connected with vertical radiant heat absorption elements. Some of the solid stay bolts were replaced with hollow stay bolts to accommodate the two-inch tubing of which the superheater elements are made. In this way the only portion of the superheater which is present in the combustion chambers is the heat absorbing portion of the elements. The superheaters are designed to operate at 180 pounds pressure per square inch and to superheat the steam to 150 degrees Fahr.

In a ship like the J. R. SENSIBAR providing ample steam for its multitudinous needs is essential for good operation. Having the boilers, it was necessary to choose some efficient system of firing coal since that is the natural fuel for vessels on the Great Lakes. After a careful investigation the Todd unit system of pulverized coal burning was selected. This vessel is a pioneer on the Great Lakes in using pulverized coal.

There are three Todd triplex pulverizers installed, each connected to one boiler by flexible metallic hose to each furnace. Each pulverizer is driven by an electric motor through a speed increaser. Electric current used is 50 cycle and as the speed of a synchronous motor operating on this current is a little slow a speed increaser is needed. The Todd pulverized coal burners were made up to suit the furnace fronts which are of the Howden type and the ignition oil burner is capable of use for full power steaming by changing the sprayer tips. The fuel oil burning equipment with the exception of the fuel oil tanks and necessary piping was also supplied by Todd.

This vessel is equipped to bunker run of mine coal. A crusher is fitted to reduce lump to a size suitable to the pulverizer mills which is approximately ¾-inch. An elevator is employed to raise the coal from the level of the bunker floor to the crusher above. From the crusher the coal passes to a ready service bunker from which it flows by gravity to the feeders on the mills. The crusher and elevator are electric motor driven and were supplied by the owner.

This installation, due to the limited space between the boilers and the forward fireroom bulkhead, demonstrates the adaptability of this system in fairly close quarters. The complete control and even distribution of coal dust to all fires in the exact amounts desired are distinctive features of the system. The equipment is sturdily built and the operation is simple and readily understood. The flexibility of firing is equal to that for oil. This first pulverized coal installation on the Great Lakes will be watched with interest by all lake operators, because they are all interested in obtaining better combustion and in eliminating the troublesome features of hand labor, grate renewals and the ash nuisance.

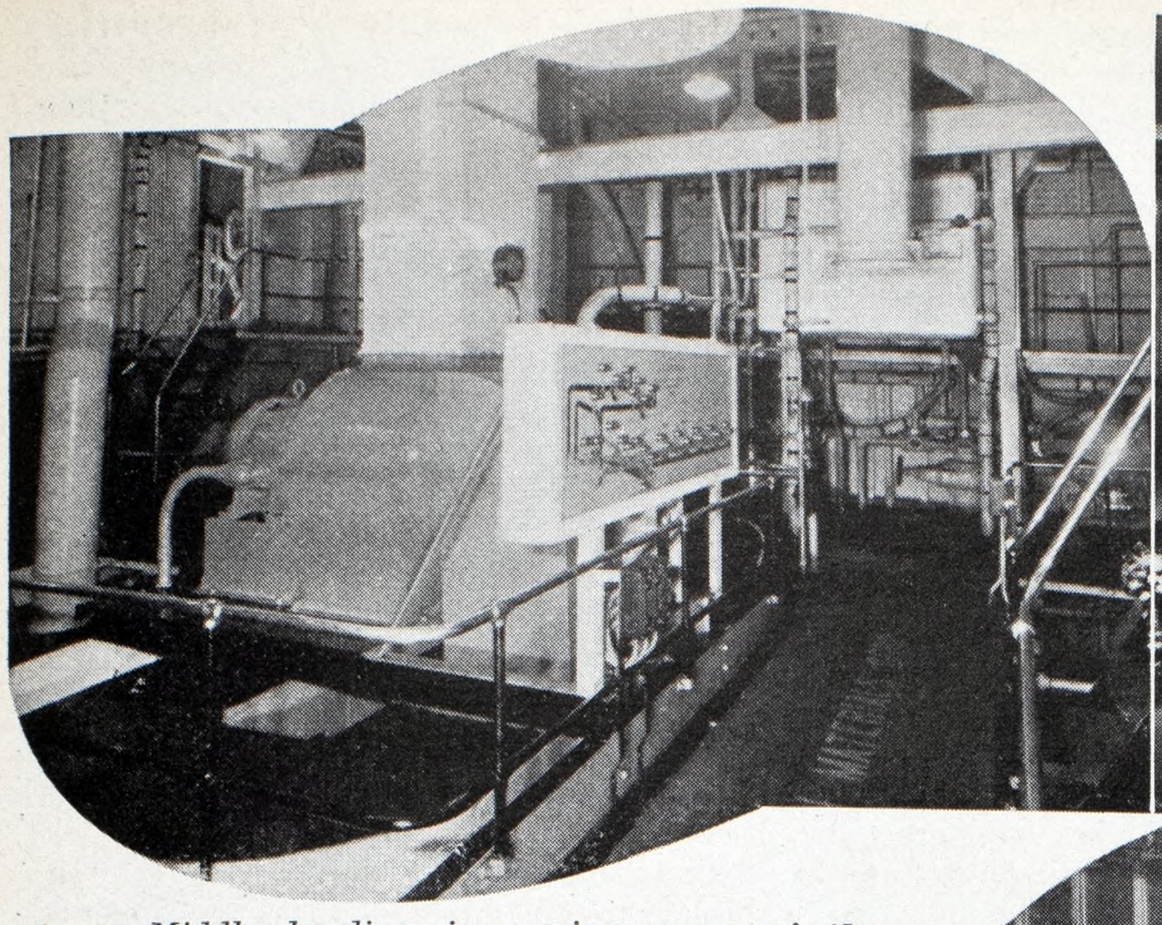
### Aids to Efficiency Adopted

In installing new propelling machinery it was necessary to use a new and larger tailshaft. The stern tube was renewed and a shaft 15 inches in diameter was found necessary. With the successful experience on the SANDMASTER in rubber stern bearings which have now been in use over four years, it was decided to adopt the latest type of Cutless rubber bearing for this ship. The stern gland with this rubber bearing in place is shown in an accompanying illustration. It is said to be the largest bearing of this type ever installed on a ship and the size of it is near if not actually the maximum that would be required for most ships. It is water lubricated.

To insure good engineering the problem of establishing correct propeller dimensions and characteristics was given to the late Rear Admiral C. W. Dyson. The point here is that the owner made every effort to apply existing knowledge and experience so that the ship as a whole might attain the greatest possible success. In line with this same reasoning an Oertz streamline rudder has been installed. It is established that this type of rudder will improve steering and maneuvering and, giving a better streamline flow to the propeller, will help the speed. On the first voyage of the SENSIBAR she was reported to have made a speed of 13 miles in loaded condition at about 19 feet draft. Favorable reports were also received indicating that she handled easy in maneuvering.

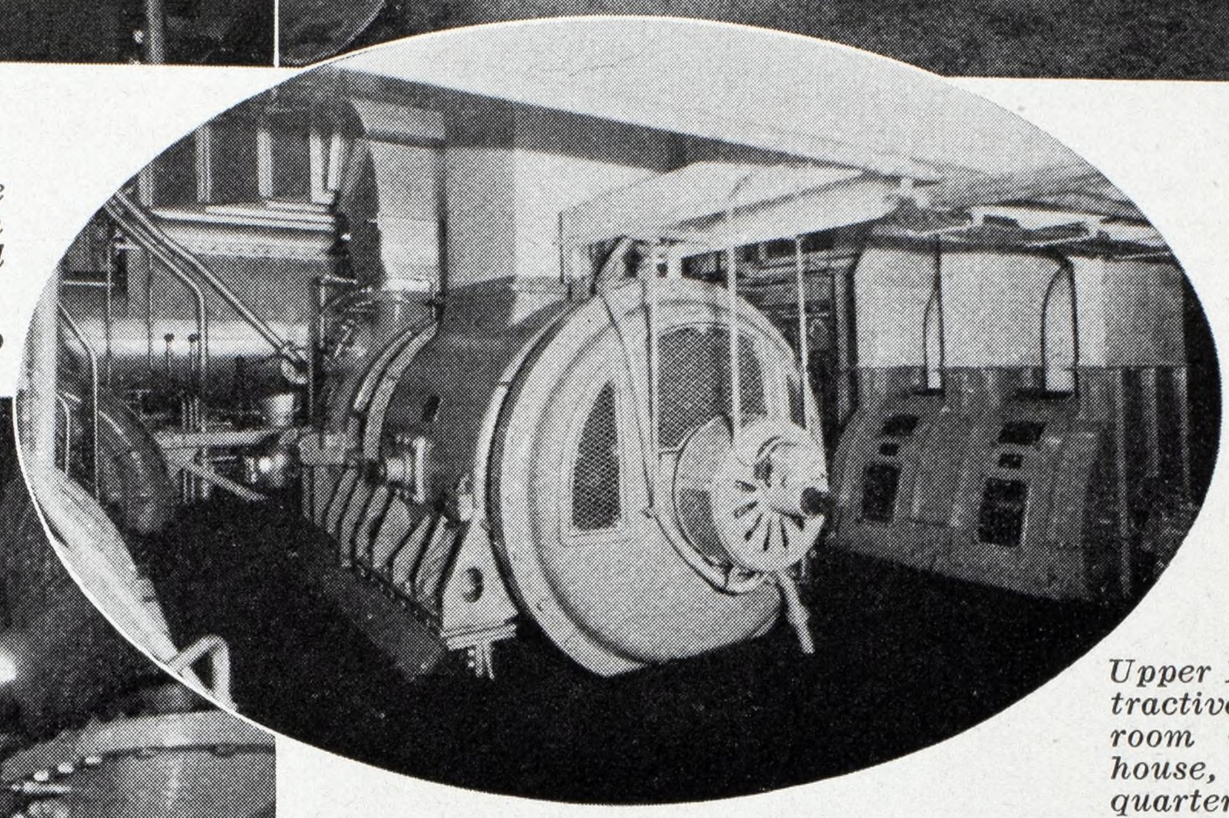
For navigation purposes she has the usual magnetic compasses, usual engine room signals in addition to the remote electrical control already mentioned. There is also a Kolster radio compass.

Every engineering feature down to the smallest detail has been studied with care in order to improve effi-

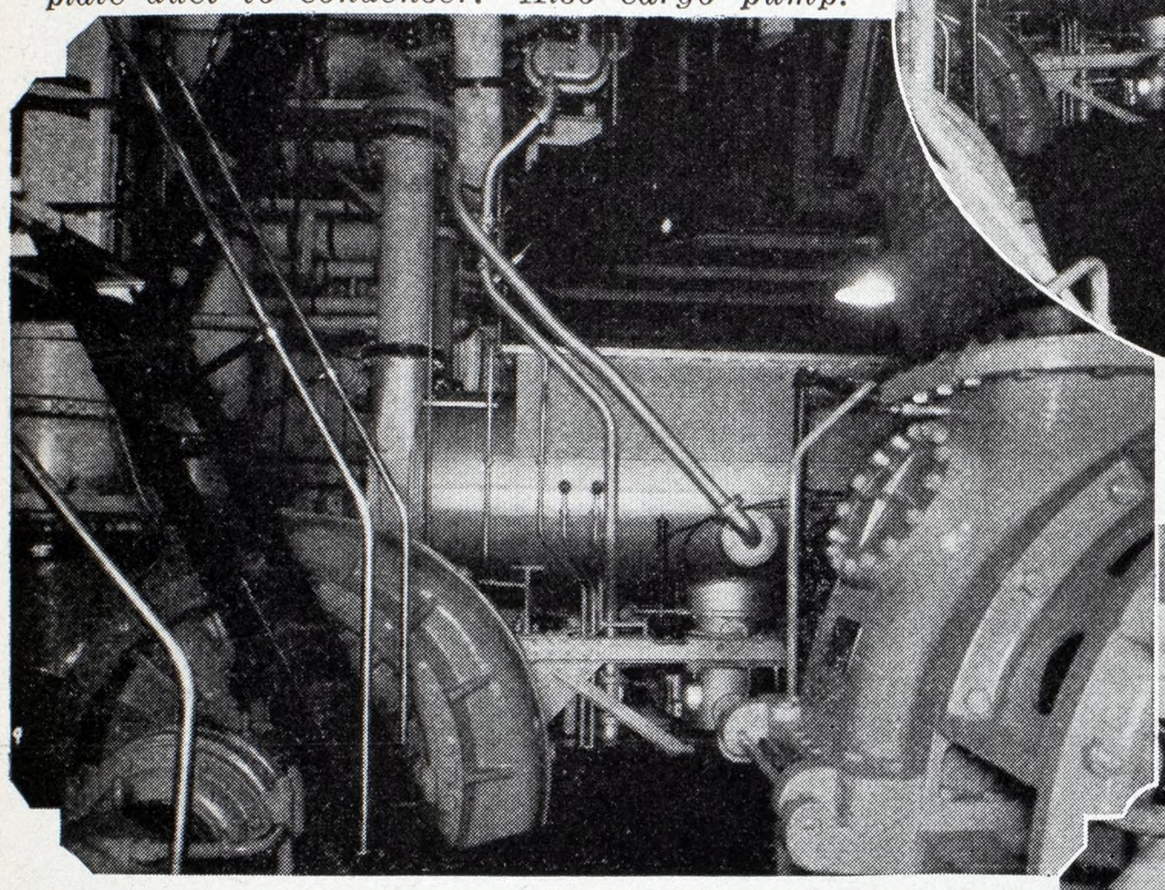


*Above—Middle landing in engine room of the J. R. Sensibar—Fan and ventilator for the main machinery—Signal board showing position of all valves; also control station for valves*

*At Right—Main turbine unit showing built-up plate duct to condenser. Also cargo pump.*

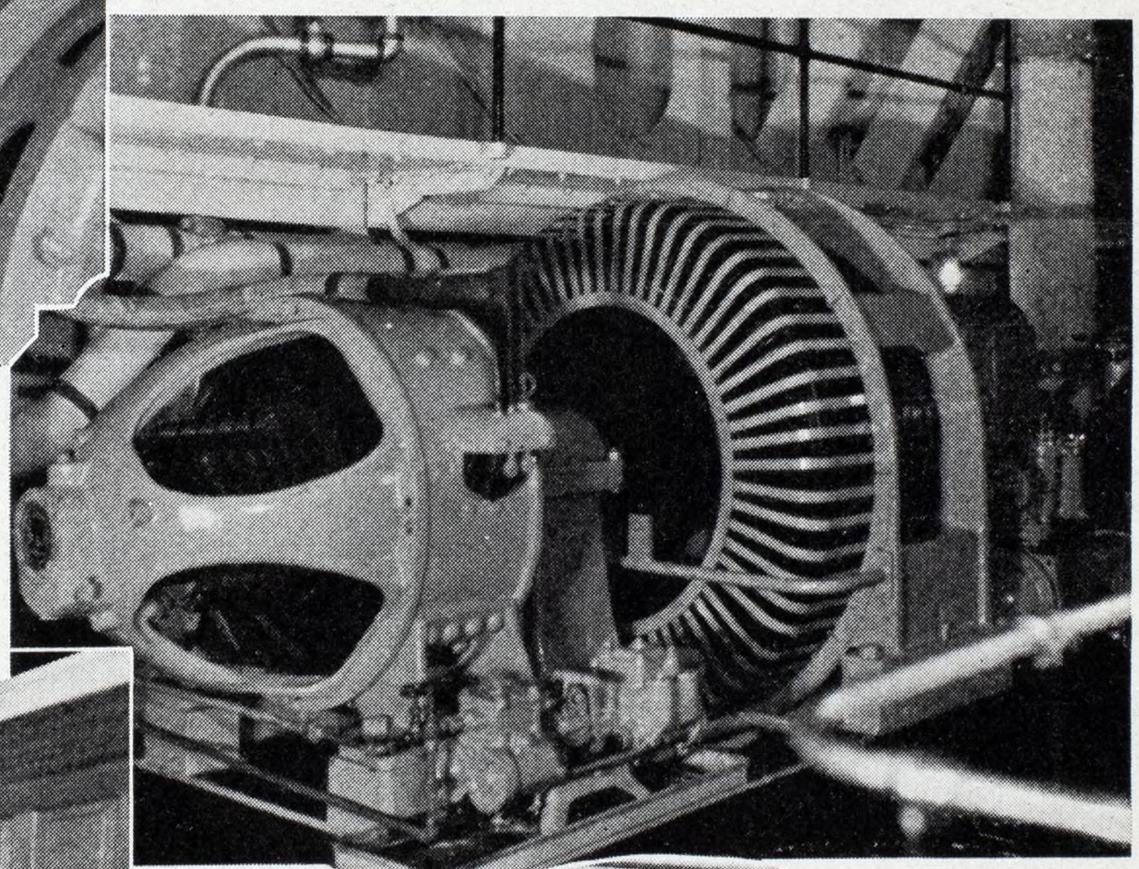


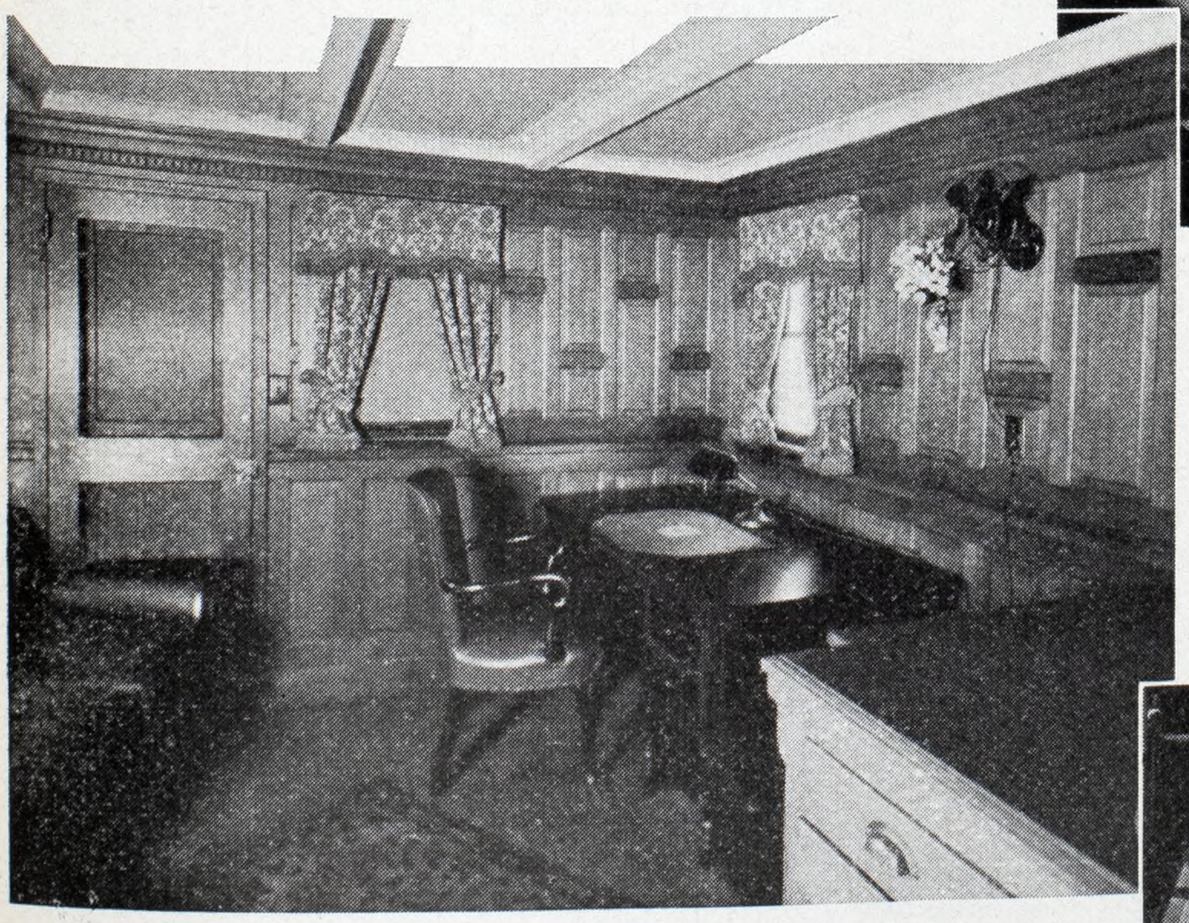
*Upper Right — Attractive reception room in forward house, paneled in quartered sawed oak, finished natural in wax*



*Above—Main generating unit. Also one of the main cargo pumps. At left may be seen the casing of one of these pumps*

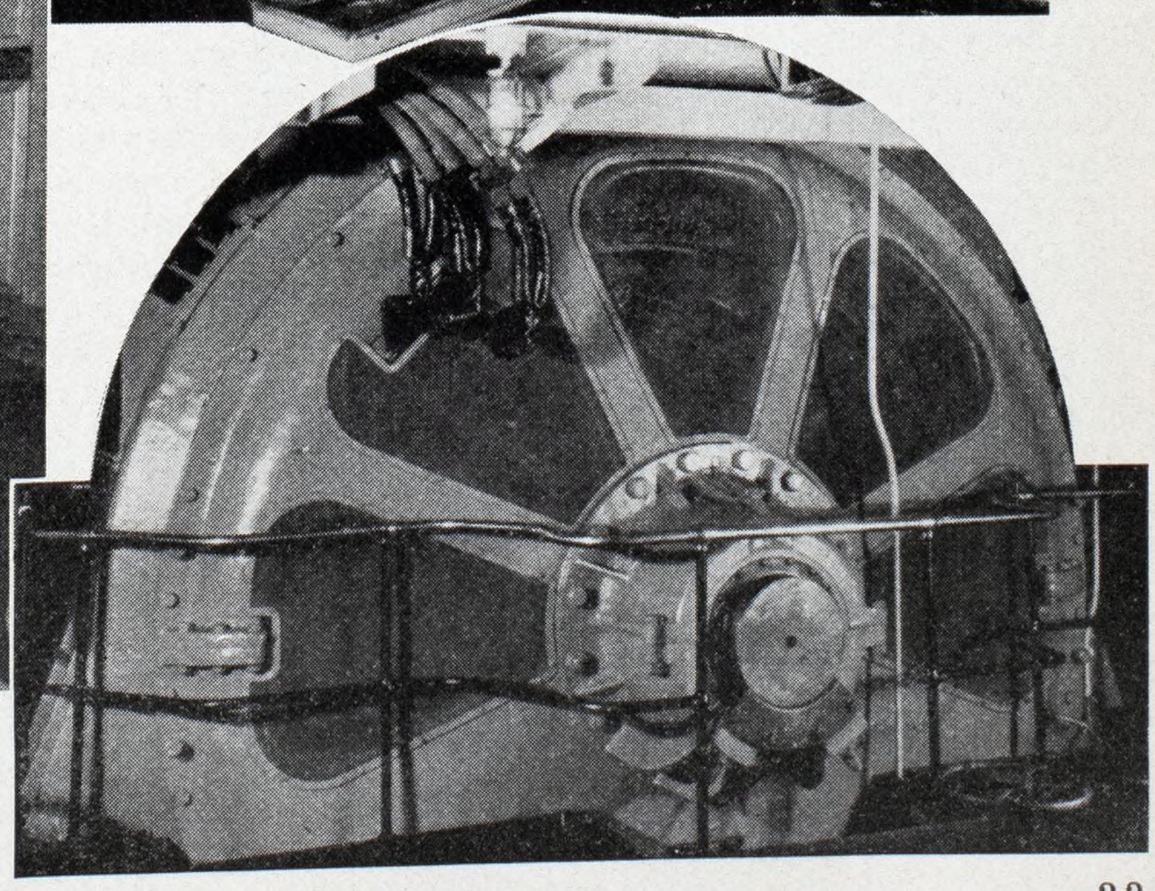
*At Right—The 750-kilowatt Westinghouse turbine generating set for auxiliary purposes. Direct current exciter attached*





*Above—Captain's office. Would do justice to a liner*

*At Right—Main propelling motor on the J. R. Sensibar rated at 3000 shaft horsepower at 125 revolutions*

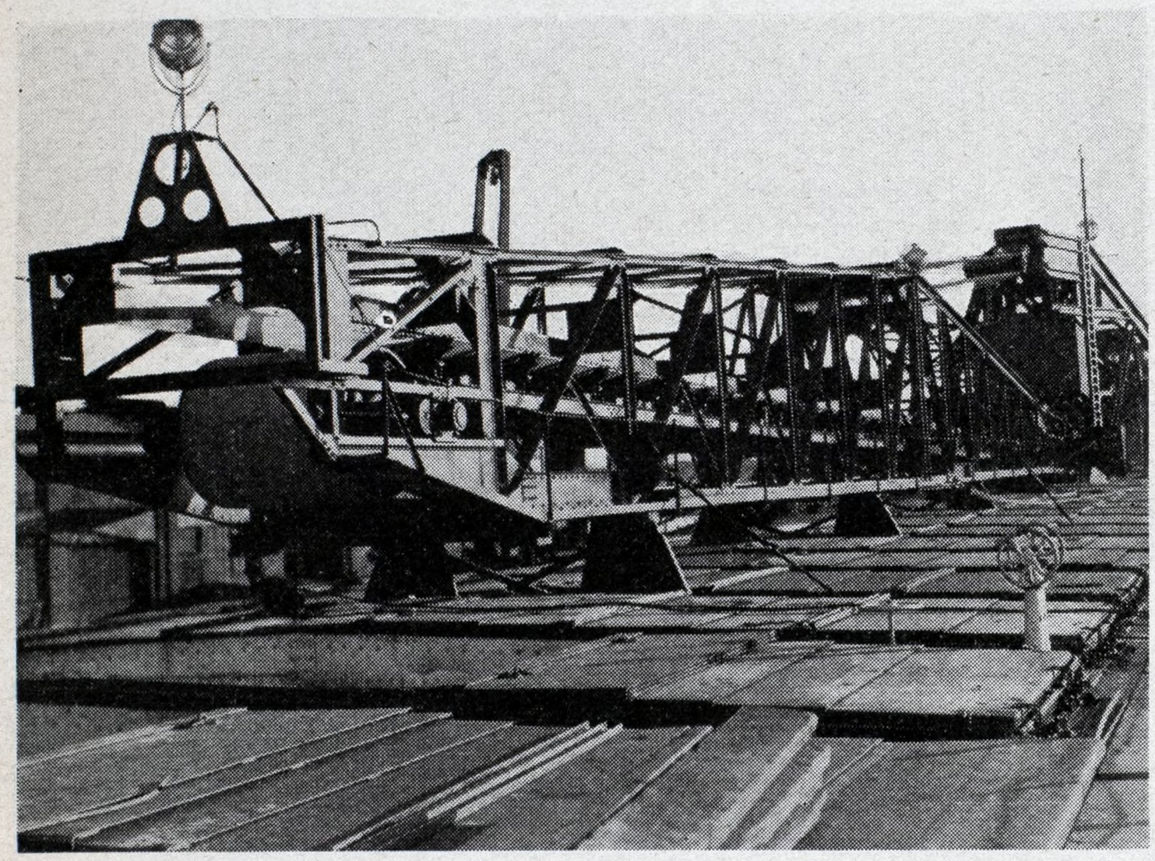


ciency. For instance, excellent vacuum is obtained (during the trial it remained steadily at 28½ inches) by the use of a single pass surface condenser of 4300 square feet cooling surface. This condenser is connected to the main turbine by a substantial plate welded built-up duct making an efficient looking installation. There is also an auxiliary condenser at 700 square feet capacity. Pumps include a double two-stage ejector with inter and after cooler; a 16-inch horizontal centrifugal pump for condenser circulating; a 3-inch 2-stage centrifugal condensate pump; a 7½ x 7 x 10-inch horizontal duplex piston pump for the auxiliary condensate; two 12-inch centrifugal jet pumps; one 16-inch centrifugal and two 6-inch centrifugal pumps for clean up service; one 2-inch two-stage centrifugal and one 14 x 8 x 12 horizontal boiler feed pump; one 10 x 12 x 12 x 12 inches combined air and circulating pump for the auxiliary condenser; one 6 x 5¾ x 6-inch horizontal duplex bilge pump; one 7 x 6 vertical duplex motor driven air compressor for repair work. All of the above equipment beginning with the main condenser was furnished by the Worthington Pump & Machinery Corp. Also the two mammoth cargo pumps were built by Worthington to the owner's ideas.

Taylor recording gages and thermometers and vacuum gage are fitted in the engine room. A No. 6 paracoil heater was supplied by Davis Engineering Corp.

It may not geneerally be appreciated but excellent quarters are sometimes provided on lake freighters. In this respect the J. R. SENSIBAR is exceptionally well done. These accommodations include four tastefully furnished rooms in the forward house arranged around a fairly spacious reception room. The sleeping rooms are decorated in a modified modern style and are very attractive. There are adjoining baths for each two rooms. The observation room on the level above the reception room is attractively decorated and furnished. The dining room, also a commodious and well appointed room has a pleasing effect. Throughout in these rooms a fine effect has been obtained by the use of quarter sawed oak panels finished natural and waxed. The effect has been further enhanced by the choice of attractive lighting fixtures. This work was done under the supervision of W. S. Fish of Albert Pick Barth Co. The kitchen is fully supplied with all the modern devices including, electric toasters, griddles, broilers, steam table, coffee urns, mixing machines and a good size coal burning range.

Every effort has been made to provide not only for the needs but for the comfort of the officers and crew. Quarters are well laid out and each senior officer has his own room. The captain and chief engineer have especially fine accommodations including in each case a comfortably furnished office as well as stateroom.



*The Great Self-unloader Boom on the J.R. Sensibar. It is Capable of Delivering Material at a Point 140 Feet From the Side of the Vessel and to a Height of 80 Feet.*

For purposes of general ventilation to living quarters, and for engine room ventilation about ten good sized Allen air turbine ventilators have been installed. The cowls of these ventilators are free to rotate and they have been found to give excellent ventilation. Complete new life saving gear has been fitted including lifeboats and equipment.

In accomplishing the huge task of building this vessel the responsibility of initiation and decision on all major features rested with J. R. Sensibar, president of the owning company. H. N. Herriman acted as naval architect and C. R. Fisher, formerly chief engineer of the Bradley Transportation Co., as consulting engineer. He is directly responsible for many of the striking electrical features of the vessel. R. A. Brinkman, superintendent of the owning company was in general charge of the work. The A frame, boom, and the dry unloading gear generally was designed by C. M. Rudow. For the American Ship Building Co., the work was carried out under the direction of A. W. Cross, naval architect; J. C. Workman, chief engineer and John Steinman, general superintendent. The vessel was in command of Capt. H. F. Bricker and the chief engineer is T. A. Wirth who stood by for some time during construction representing the owner.

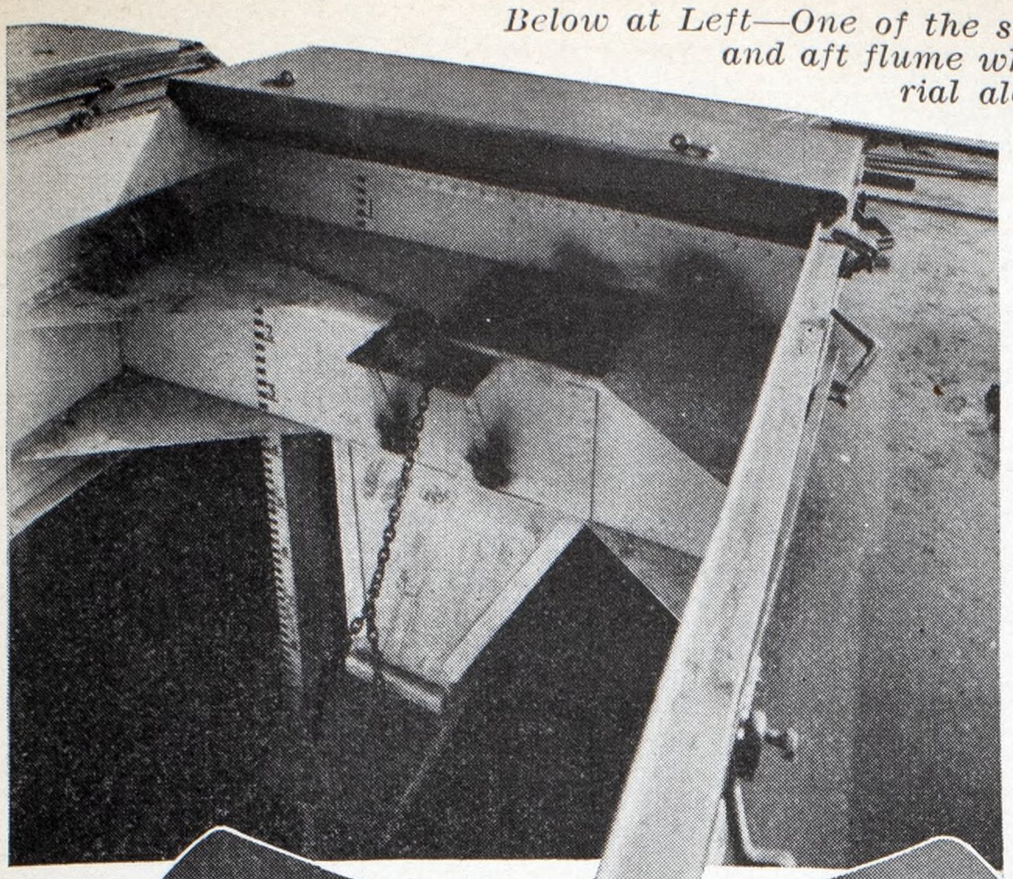
## To Hold Annual Congress

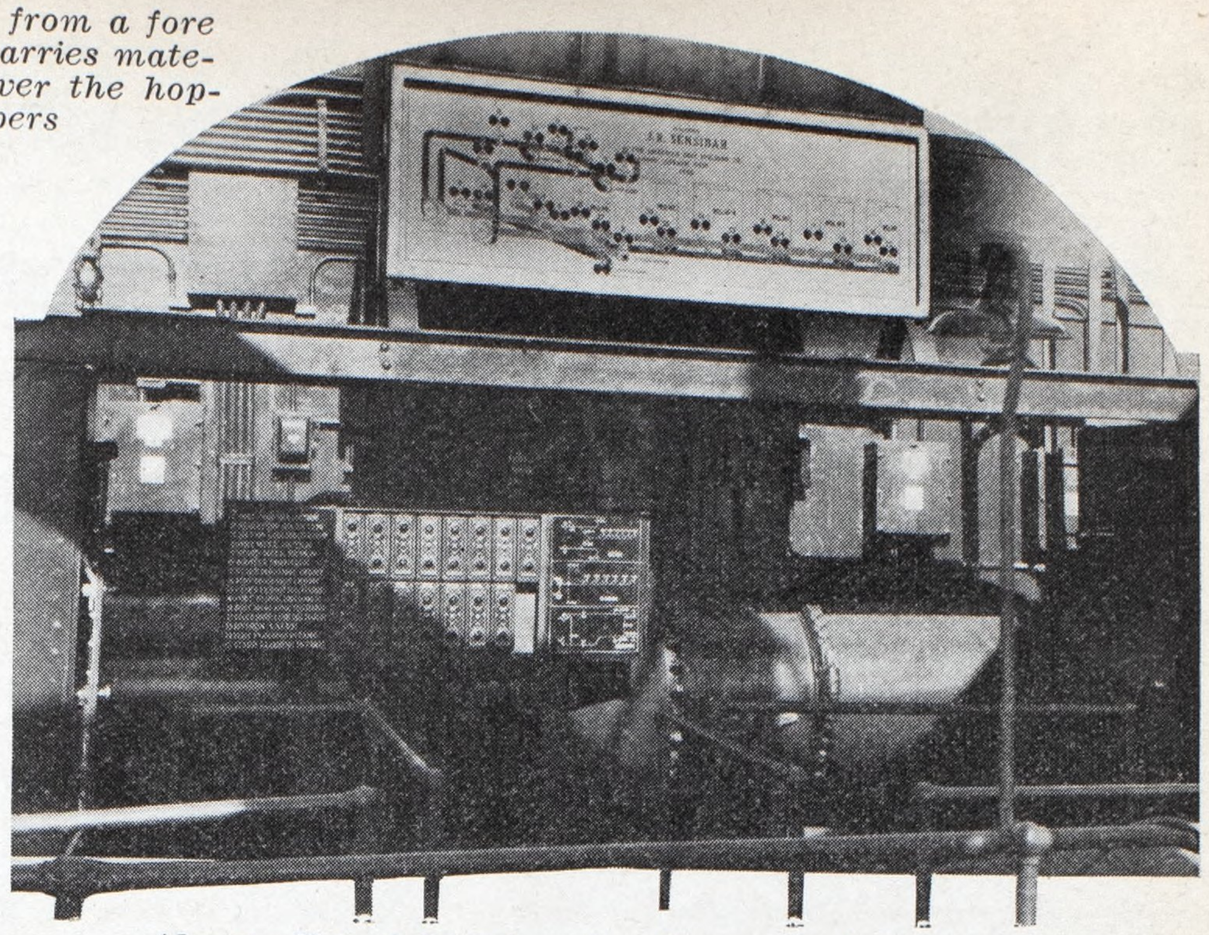
The subjects to be considered at the twenty-sixth annual convention of the National Rivers and Harbors Congress which is to be held at Washington Dec. 9 and 10 cover a wide range of subjects and are of great interest and importance. In the preliminary list of subjects and speakers issued Nov. 11, the following are included: *Water Ways and the War Department,* by Hon. Patrick J. Hurley, secretary of war; *The National Aspect in River and Harbor Improvements,* by Major Gen. Lytle Brown, chief engineer, U. S. Army; *The Transportation Situation,* by Samuel O. Dunn, editor *Railway Age; Water Ways and Railways,* by the Hon. Smith W. Brookhart, U. S. senator from Iowa; *Unification of the Waterways of the United States,* by the Hon. S. Wallace Dempsey, chairman, committee on rivers and harbors; *An American Merchant Marine,* by the Hon. T. V. O'Connor, chairman, United States shipping board; *The Atlantic Intracoastal Waterway, Its Meaning and Progress,* by the Hon. J. Hampton Moore; *Marinas; Their Growth and Their Operation,* by Captain R. R. Blythe; *The Beaver, Mahoning and Shenango Rivers,* by the Hon. John G. Cooper, Youngstown, O.; *Standardization,* by Theodore Brent, president Redwood Steamship line; *Waterways of Czechoslovakia,* by Prof. Ing. Antonin Smrcek, Brno, Czechoslovakia; and *President's Annual Address,* by the Hon. Riley J. Wilson, Ruston, La. Other papers for which the speakers are to be announced later are: *America's Greatest Port, Our Inland Seas, Boston Harbor and the Cape Cod Canal, Recent Waterways Developments in Texas, Pacific Coast Rivers and Harbors.*

Despite two days of bad weather, the North German Lloyd liner BREMEN docked at New York on Nov. 11 after having made the transatlantic passage in four days, 19 hours and 30 minutes, approximately two hours slower than the record crossing of her sistership, the EUROPA. She carried 1805 passengers.

While in dry dock at Hamburg, the BREMEN had 15 feet added to her twin funnels or dummy stacks in order to overcome the oil-smoke menace to promenaders on her sun and boat decks. Vibration that had caused considerable discomfort to passengers in the second class was said to have been curtailed with the new pitch of her quadruple propellers.

*Below at Left—One of the spouts from a fore and aft flume which carries material along over the hoppers*

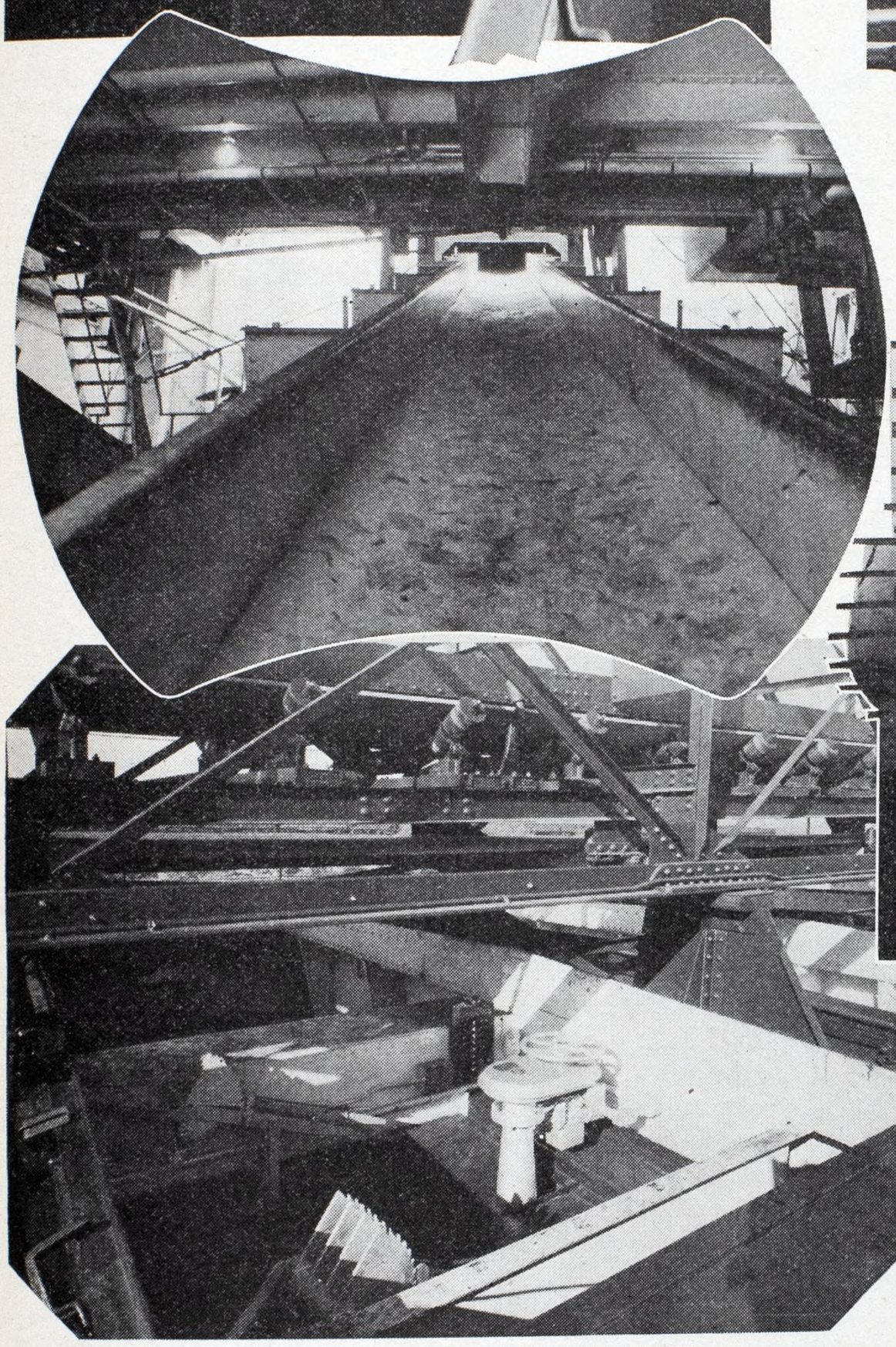


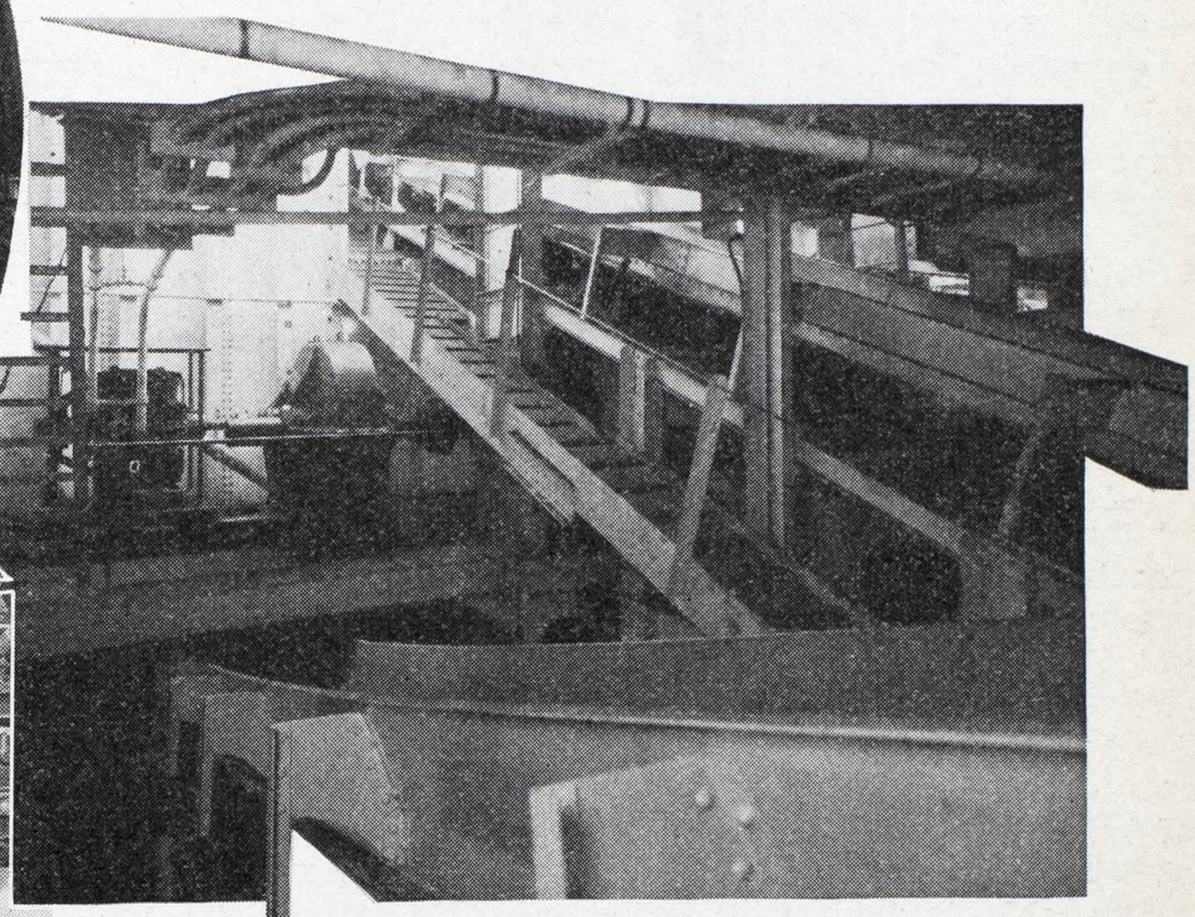


*Above—Signal board and valve control station on deck*

*At Left—Incline belt taking material from the forward end of ship to deck and delivering to boom*

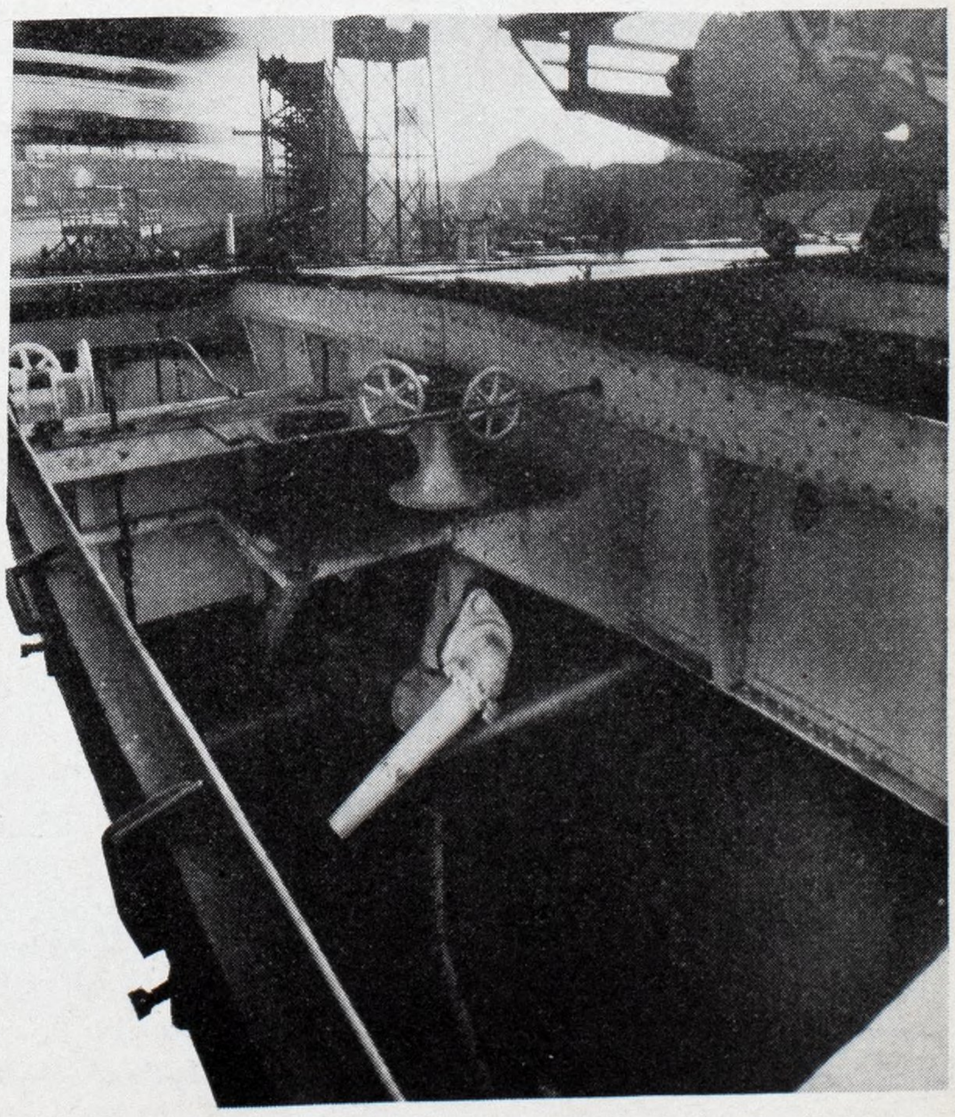
*Below—Forward end showing the conveyors delivering to incline belt which takes material on deck*





*At Left—Looking into one of the hatches showing valve and gate control for wet cargo*

*Below—Looking across the ship to port showing starboard hopper and jet nozzle with control valves for wetting down when discharging*



*Below—Massive A frame of heavy structural shapes supports the long boom conveyor*

# Passing Lanes at Sea Given Approval at Conference

By Lynne M. Lamm

MORE than a hundred representatives of the shipping interests of the country attended a conference in Washington on Oct. 29 called by Dickerson N. Hoover, supervising inspector general, steamboat inspection service of the department of commerce to consider safety at sea. The conference went on record as favoring the principle of passing lanes at sea.

As a result of the conference committees will be appointed by various steamship owners' organizations to work with the steamboat inspection service to consider practical plans of designating these sea channels whereever practicable. It will be the purpose of these committees to study the various seaboards and to recommend voluntary observance of passing lanes wherever conditions warrant them.

Ira H. Campbell, general counsel for the American Steamship Owners association of New York, presented the following resolution which was adopted by the meeting;

"Resolved, that this conference, representative of the general shipping interests of the United States, declares that it is their chief concern to promote the safety of life and property at sea;

"That in furtherance of greater safety it recommends the voluntary establishment and use of lanes of traffic by shipping interests wherever practicable.

"That to the attainment of these ends, the conference further recommends that the committees heretofore created, with such additional representatives and committees, as shall be deemed advisable, of the shipping industry, chiefly concerned in the navigation of the various divisions of the coastal and inland waters of the United States, be requested to proceed as rapidly as possible to consider further the practicability of adopting such lanes, and to secure the agreement of the shipping interests concerned to conform to the recommendations of the committees, and to report promptly the results of their deliberations and efforts to the department of commerce."

The conference decided also that as an additional safeguard investigations be made of mechanical devices purporting to lend greater safety to ocean travel by the reduction of vessel collisions. It was decided also by the meeting that the anchoring of oil and gasoline tankers in fog as a means of avoiding dangerous collisions is impracticable and of more danger than if the tankers continued under way. It was stated on the floor of the conference that captains of tankers have already been given orders not to embark in heavy fog and to take every precaution for safety.

Frank S. Davis, of the maritime association of the Boston chamber of commerce, advocated navigation lanes on coastwise waters where necessary but recommended establishment of such lanes should be voluntary with the shipping interests.

Mr. Davis presented a statement recommending that owners of steam and motor vessels other than tugs with tows have their vessels, so far as is safe and practicable, use such lanes as may be established and that towing interests should operate outside of lanes which may be established for steamships.

Rear Admiral Philip Andrews, retired, representing the same association, stated that the value of coastwise shipping lanes in foggy weather is obvious, and that just as transatlantic lanes have proved their worth so will coastwise lanes prove valuable in decreasing loss of life and property. He advocated that large transatlantic ships give radio signals on coming into harbors and thereby decrease the possibility of "running down" smaller boats and fishing vessels.

H. B. Walker, president of the American Steamship Owners association, New York, stated that while his organization approves the consideration of establishing lanes, it has not made a thorough investigation of the specific problems under consideration. No lanes can be rigidly adhered to, however, by all boats at all times under all conditions, he said.

Capt. E. E. O'Donnell, of the Eastern Steamship Co., Boston, advocated that immediate action should be taken in establishing double-track shipping lanes in Massachusetts and Pleasant bays and said that he was opposed to any further delay of action in regard to these two bodies of water.

J. C. Rohlfs, president of the Pacific American Steamship association, stated that his organization wanted the opportunity to study the proposed Atlantic coastwise lanes before any were adopted. Among objections to lanes advanced by Mr. Rohlfs were the following: Many small vessels without radio or similar equipment would be unable to follow the lanes; foreign-flag ships could not be required to use the lanes; adhering to lanes would mean greater mileage with greater costs; shipping on the Pacific coast has not arrived at the point where conditions are crowded enough to make lanes necessary.

Inspector General Hoover stated as the feeling of the conference that in principle, passing lanes are supported where practicable and that through regional committees it will actively pursue problems presented in various sections of the country.

The conference was attended by an unusually large body of representative steamship men from all sections of the country. There was also present a number of officers of the navy and officials of all departments of the government having to do with shipping. At the moment the greatest practical value of this meeting is in the attention, nation wide, which has now been forcibly directed to the dangerous conditions which caused the PINTHIS-FAIRFAX disaster in Massachusetts bay this past summer.

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The author, Lynne M. Lamm, is Washington representative for MARINE REVIEW.

## Reorganize Bauer Wach Co.

The American Bauer Wach Corp., organized some time ago to introduce the Bauer Wach method of increasing the power and reducing the fuel consumption of vessels equipped with reciprocating steam engines by the installation of exhaust turbines, was recently reorganized and the following officers elected: F. W. Kennedy, president; James S. Milne, vice president; L. S. Rice, treasurer; H. L. Watson, secretary. Mr. Milne, who previously managed the Bauer Wach interests in this country, will remain in charge of the American company's activities. The DeLaval Steam Turbine Co., Trenton, N. J., is the sole licensee for building turbines and gears by the American Bauer Wach Co.

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Magnolia Petroleum Co., subsidiary of the Standard Oil Co. of New York, has been awarded a contract for 650,000 barrels of grade A fuel oil for gulf ports at 85 cents a barrel.

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## Seeks Aid of Shipping Men on Training of Crews

Commissioner H. I. Cone of the United States shipping board, chairman of a committee named by the third national marine conference last April in Washington has submitted a questionnaire to shipping men in all parts of the country on a policy of training for officers of the American merchant marine.

The questions include the advisability of a national system, the type of such system, its combination with a state system, the part that private steamship companies should take in the training, the value of actual experience on a sailing ship for men

training to be deck officers and experience in machine shops for men training to be marine engineers.

The preliminary training of potential officers plays an important part in the committee's study and it has asked for opinions on the type of men who should be instructors of officers in training and lists naval and merchant marine officers against civilian instructors.

In a recent address to the Propeller club, New York, Capt. James J. Tomb, superintendent of the New York State Merchant Marine academy, stated that the progress of science and naval construction has been so rapid that ship officers should leave their ships at intervals to study the new inventions and scientific problems of the sea under capable instructors. He recommended that post graduate courses be provided for officers of merchant ships which would better fit them for their duties.

## President's Committee to Present Final Report

President Hoover's shipping advisory committee was scheduled to make its final report in Washington on Nov. 24. While no official announcement has been made at this writing, it is expected that the long standing dispute over the proposed sale of the shipping board's America France and American Diamond lines to private owners will be settled and that the report will recommend that the government withdraw both lines from sale and continue their operation under the control and supervision of the present managers.

In reaching the reported conclusion that the disputed lines should remain under the ownership of the government, it was stated that the committee was prompted by two dominant arguments: First, it would be unwise for the United States to risk a major failure in its still youthful privately owned merchant marine by turning over two costly lines in the midst of a period of world wide depression, with resultant slowing down of foreign commerce; second, government funds for ocean mail contracts, another important source of revenue for private American merchant lines, are low, with the treasury in no condition to stand a heavy drain for that purpose at this time.

If the board accepts such a recommendation, and predictions are that it will do so, it will mean a temporary victory for the managing operators, as they would continue operating the ships under their present contract with the board. However, as soon as business and trade have recovered from the present depression it is likely negotiations will be reopened for the sale of the lines to the United States lines.

# Powerful Diesel Electric Tugs for Erie R. R.

APPLICATION of diesel electric to the four powerful tugs building for the Erie railroad is an indication of the satisfactory performance of this drive in other large harbor craft. One of the four named the CLEVELAND is shown as a trim and business-like unit in the accompanying illustration. This vessel was built by the Pusey & Jones Corp., Wilmington, Del. and went into service in New York harbor on Monday Oct. 27.

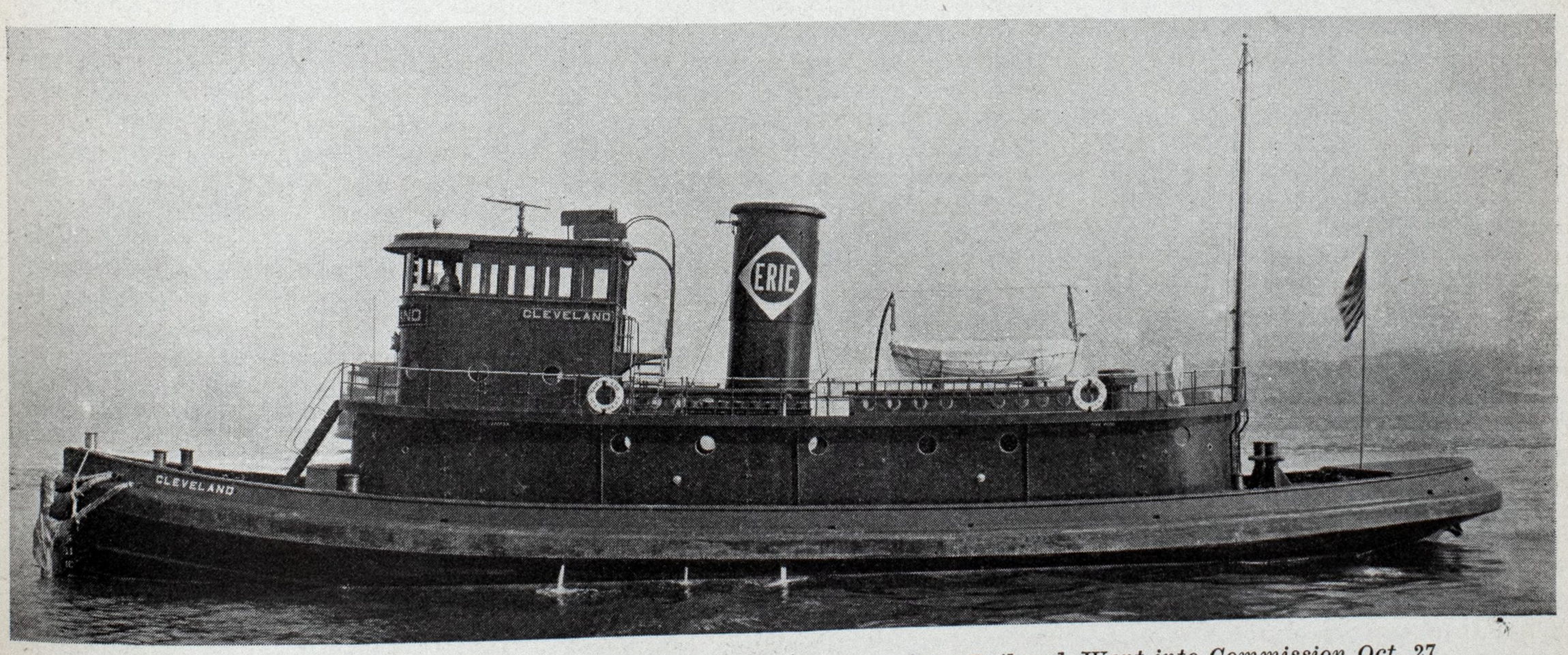
The CLEVELAND is the first of the four new tugboats for the Erie by Pusey & Jones Corp. She is undoubtedly of the most modern design throughout and is said to be the most powerful of her kind in New York harbor. In fact these towboats in antipication of their great power have been dubbed "locomotives of the sea."

The tug ROCHESTER, sister ship of the CLEVELAND was launched July 30, and went into commission Nov. 17. The remaining two, the OLEAN and SCRANTON will be commissioned some time in December making a new fleet of four new tugs.

The principal dimensions of the CLEVELAND are: Gross tonnage, 235; net tonnage, 159; registered length, 102 feet 8½ inches; registered beam, 26 feet 1¼ inches; and registered depth, 11 feet 8½ inches. The hull is substantially constructed of steel throughout. The propelling power consists of two six-cylinder Ingersoll-Rand, four-cycle, oil engines of 15-inch bore and 20-inch stroke developing 500 brake horsepower each, at 265 revolutions per minute or a combined output of 1000 horsepower for main and auxiliary power in each towboat.

Each engine is direct connected to a 330-kilowatt, 250-volt General Electric generator. The propelling motor, direct connected to the propeller, is made up of two armatures mounted on a common shaft with two independent magnet frames and two sets of current collection apparatus. This motor is capable of delivering continuously to the line shaft 800 horsepower at any speed from 105 to 135 revolutions per minute.

Fire fighting equipment, which is an important feature in all four of these tugboats, consists of one Cameron three-stage fire pump with a capacity of 500 gallons per minute. These pumps are driven by a General Electric compound wound motor of 75 horsepower at 1700 revolutions per minute and 230 volts. The fire pump discharges to monitor nozzles on top of the pilot house and on both sides of the deck house forward.




*Diesel Electric Tug Cleveland, Built by Pusey & Jones Corp. for Erie Railroad, Went into Commission Oct. 27*

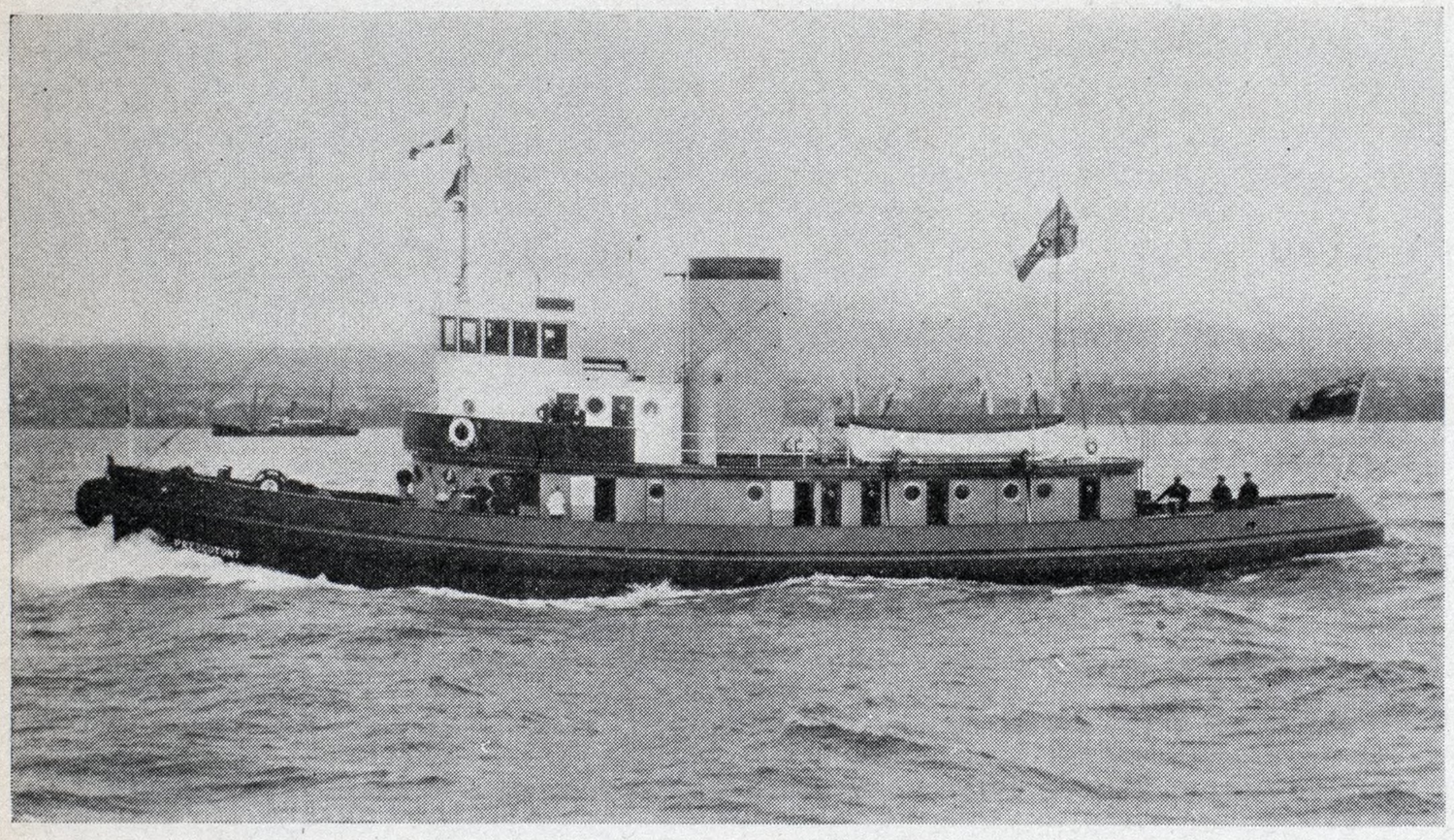
# Diesel Electric Tug and Float Feature Remote Control

A VESSEL of peculiar interest and incidentally the first of her type constructed in Canada is the diesel electric tug PRESCOTONT which has been built at the Davie Shipbuilding & Repairing Co.'s yard at Lauzon, Que., to the order of the Canadian Pacific Car & Passenger Transfer Co. Ltd., which company operates a railway ferry service in the joint interests of the Canadian Pacific railway and the New York Central railroad.

The PRESCOTONT tows the new car float Ogdensburg (described in detail below) between the New York Central terminal at Ogdensburg, N. Y., and the Canadian Pacific terminal at Prescott, Ont. When the float is ready to leave, the tug noses up, the two boats are tied together, an electric connection is made and the pilot leaves the tugboat and boards the car float. The trip is then made with the pilot on the bridge of the towed boat, all the operations of the machinery on the tug, steering, etc., being controlled from that point. This remote control was essential to the proper operation of the towing system, as the tugboat is small compared to the car float and were the pilot to remain on the tug he could not see well enough in all directions to control the movements of the two boats. The special remote control employed was designed and built by the General Electric Co., who also built the propulsion equipment on the tug.

The PRESCOTONT is of steel specially strengthened for ice breaking for all year round service and was built to the requirements of the Canadian steamboat inspection and Lloyd's Register, being rated 100 A1 for towing purposes. Her keel was laid on June 30, the vessel launched on Sept. 11 and delivered ready for service after carrying out satisfactory trials on Oct. 10, which is considered a record for a vessel of this type. Her principal dimensions are as follows: Length overall, 117 feet; breadth overall, 27 feet; depth, 13 feet 6 inches; draft, extreme, 12 feet; speed, 11 knots.

The propelling machinery comprises two Model 6-174 4-cycle Winton airless injection diesel engines connected directly to the main and auxiliary generators, each engine having six cylinders 15-inch bore by 22-inch stroke, developing 500 brake horsepower at 245 revolutions per minute.



*Diesel Electric Tug Prescotont on Trial Oct.* 10, 1930 *on the St. Lawrence*

The electric equipment in conjunction with the diesel engines was supplied by the General Electric Co., and is as follows: Propulsion motor: 1 double-unit, 800 horsepower, 105/135 revolutions per minute, 500-volt motor; main generators: two 330 kilowatt, 245 revolutions per minute, 250-volt generators; auxiliary generators: two 50 kilowatt, 245 revolutions per minute, 120-volt direct-current auxiliary generators for excitation of main generators and propulsion motor and for auxiliary power. These generators are direct-connected to the main generators; switchboards: 1 control panel for main generators and propulsion motor, 1 pilot house panel, 1 auxiliary generator panel and a distribution switchboard for various auxiliary motors about the vessel; propulsion-motor ventilating set: consists of one Buffalo Forge Co., size 4½ duplex conoidal fan, to deliver 6100 cubic feet per minute at 2.1 in static pressure, and driven by a CDM-73, 5 horsepower, 850/950 revolutions per minute, 115-volt, shunt-wound motor.

Propulsion power is obtained from the two diesel electric units, consisting of a direct-current electric generator driven by a diesel engine; each generator mounts a direct-connected auxiliary generator. Electric power is generated in the main generators and is transmitted to a double-unit propulsion motor which is direct-connected to the propeller. The power from the generators to the motor is controlled by rheostats and switches mounted on or operated from the main control switchboard. Operating of the tugboat may be controlled from the panel in the engine room or from the pilot house by means of two controllers, one located at the engine room control panel and one in a compartment under the floor of the pilot house.

In order that the tugboat may be operated from the car float there are installed on the car float a controller, two operating pedestals and a speed indicator. This equipment is connected to the equipment aboard the tugboat by cables and is operated in the same manner as the tugboat equipment. Auxiliary power aboard the car float is also obtained from the tug. The two 50 kilowatt direct-connected auxiliary generators supply current for excitation of the two main generators and the propulsion motor and also supply power to the various auxiliaries, such as pumps, fans, lights, etc. They are inter-connected to allow either one to be utilized for both excitation and auxiliary power, or for one to furnish excitation and the other auxiliary power. It is also provided that either of the main generators may be connected, one at a time, to the fire-pump bus.

The propulsion motor mounts a terminal board carrying links. For normal operation these links should be connected for operation of both motor units. In emergency, when one of the units is disabled, the links can be connected to cut out the armature and field of the disabled unit and allow the other unit to propel the boat. One of the two controllers on the tugboat is mounted back of the motor panel and the other is mounted in a compartment under the pilot house. The former is the engine-room controller and is operated from the handwheel mounted on the front of the motor panel. The pilot-house controller is operated from either of two pedestals mounted in the pilot house. Control of the boat is transferred from the engine-room controller to the pilot-house controller or to the controller aboard the car float by means of the three-position transfer switch mounted on the motor panel. This transfer switch cannot be op-

erated unless the transfer-control switch is in the "off" position, in which position the main excitation contactor is open.

The pilot-house panel mounts the following instruments: 1 motor ammeter, 2000-0-2000 ampere scale, 1 propeller speed indicator, 150-0-150 revolutions per minute scale. The propeller speed indicator shows the speed of the propulsion motor directly in revolutions per minute and the full load is indicated when the ammeter reads 1320 amperes.

The engine room auxiliaries consist of the following:

One Hill diesel 10 kilowatt auxiliary generating set which can be used for lighting purposes and in conjunction with the air compressor for charging the air reservoirs for starting the main diesel engines, this unit being arranged for hand starting.

One 5 inch x 2¼ inch x 4 inch two-stage vertical air compressor coupled to a General Electric 10 horsepower, 125-volt compound-wound direct-current motor and having a final discharge pressure of 300 pounds per square inch.

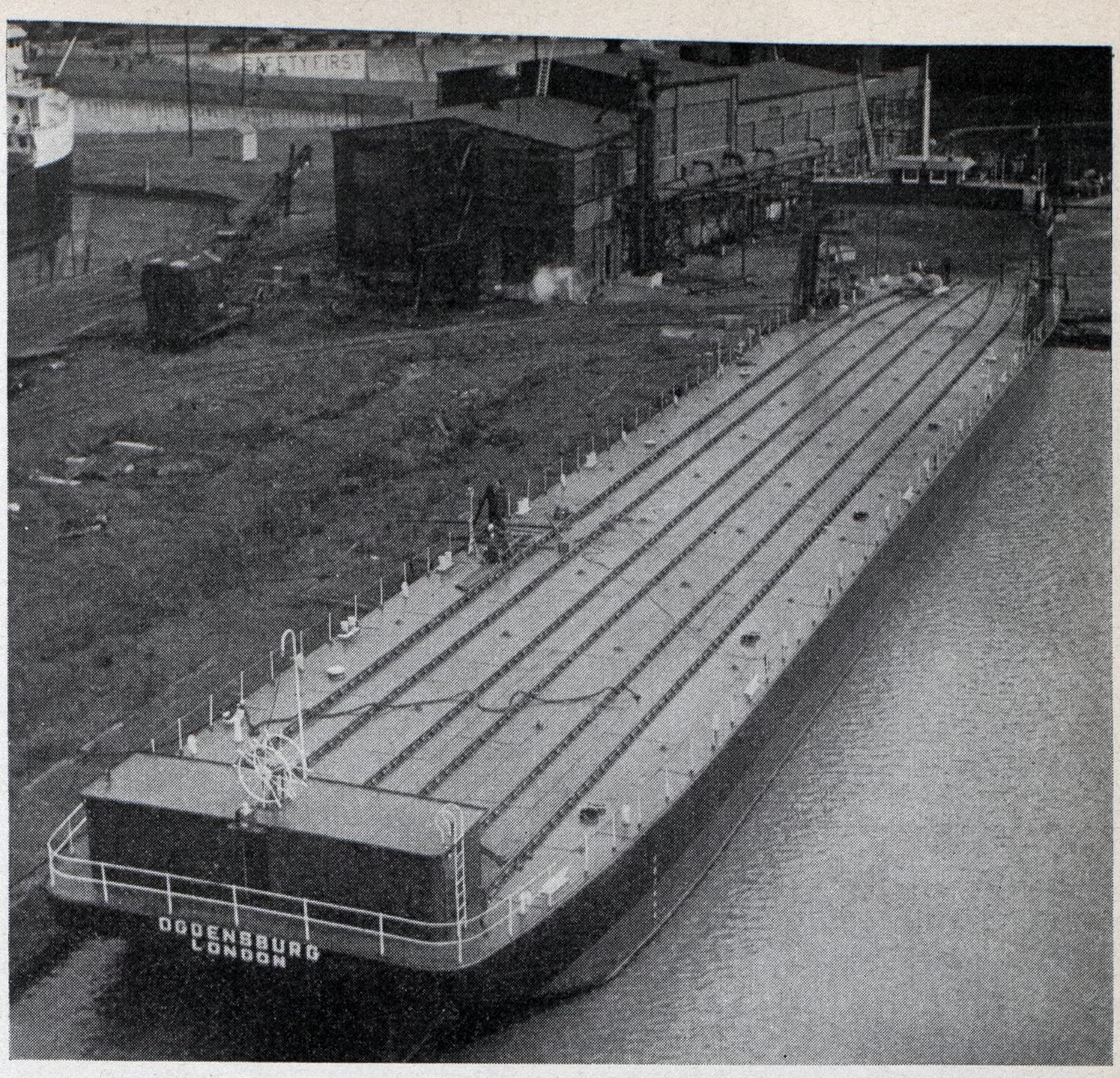
One Worthington auxiliary circulating pump of the horizontal duplex piston type, driven by a 10 horsepower General Electric motor through double reduction gear.

One Worthington general service pump similar to the auxiliary circulating pump but driven by a 15 horsepower General Electric motor and so arranged that the revolutions per minute can be varied between 48 to 96.

One two-stage Worthington centrifugal fire pump direct connected to a 75 horsepower General Electric direct current motor and having a capacity of 500 gallons per minute at a pressure of 150 pounds per square inch.

Fuel and lubricating motor driven transfer pumps of ample capacity.

One Sharples lubricating oil centrifuge.

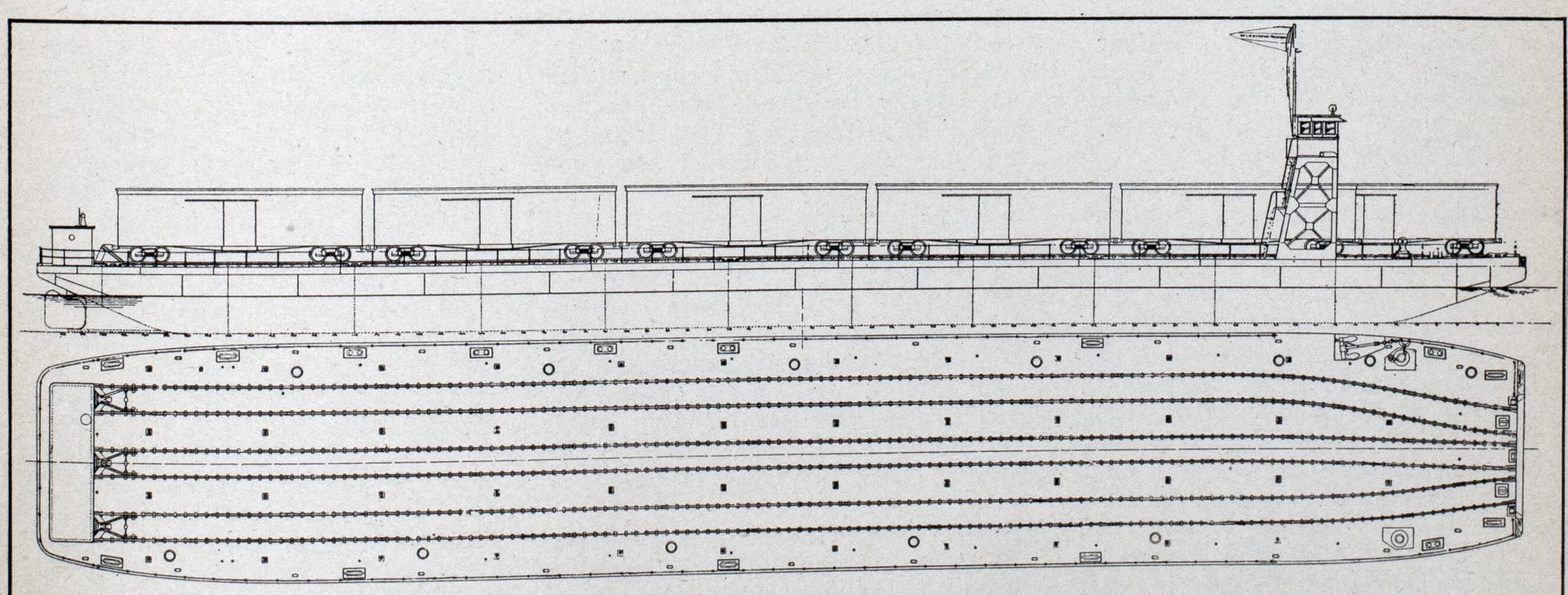



*Steel Car Float Ogdensburg at Lorain, O., yard of American Ship Building Co.*

One 10 horsepower Orr & Sembower vertical heating boiler, fitted with a Fess oil burning unit.

The main propulsion motor drives a nickel steel propeller through a Michell thrust block of ample surface. Special arrangements have been made to utilize the peak tanks as a circulating medium during the winter months in the event of the sea cocks icing up. A complete fire fighting installation has been provided, consisting of three stand pipe connections on the main deck and a Monitor connection on the roof of the pilot house, all being direct-connected to the centrifugal two-stage fire pump. A standpipe connection has been provided for on the after main deck connected to the general service pump with a flexible hose for pumping out the car float.

The electric steering gear has been supplied by the Benson Electric Co., the control being of the full magnetic and follow up type and so arranged that the steering motors on the tug and float alongside can be operated simultaneously from the pilot house on the tug or from the wheelhouse on the float. The anchor windlass is of the Benson Electric type and of ample capacity and power to lift both anchors simultaneously.



*Deck Plan of Steel Car Float Ogdensburg Showing General Arrangement. Built by American Ship Building Co. for Canadian Pacific Car & Passenger Transfer Co., Limited*

Although under ordinary operating service conditions the crew will live ashore, ample crew accommodation has been provided in case the vessel may at some time be required to be utilized in more ordinary tug service. This accommodation is of high class design and finish and includes cabins for captain, mates, chief engineer and second engineer, the crew being housed in the space under the forward deck. A large dining saloon, tastefully paneled in hard wood, is located adjacent to the galley and the forward under deck accommodation is entered through this room, thus eliminating outside companionways. The culinary and cooking arrangements have received special attention, the galley being fitted with every modern convenience, including a cold store cooled by an electric driven Frigidaire refrigerator and a Prowse Range Co.'s range. The sanitary, heating and lighting arrangements are of a very high class standard specially to meet winter conditions.

During the trials the vessel was operated from the pilot house control by the captain and successfully demonstrated the easy handling of the tug under all conditions.

The steel car float OGDENSBURG, launched on Aug. 30 and completed Sept. 30, was built at the Lorain yard of the American Ship Building Co. for the Canadian Pacific Car & Passenger Transfer Co. Ltd. The vessel was built under Lloyd's classification and is particularly heavily constructed for all year round service. She is of 1500 gross tons and has a capacity of 16 45-foot cars loaded. Her principal dimensions are: Length overall, 290 feet; breadth molded, 45 feet; depth molded, 12 feet 6 inches. The pilot house and navigating bridge at forward end are elevated 19 feet above the deck.

### Can Steer Tug from Float

The float is equipped with twin rudders, operated by a Benson Electric steeromotor in the after house, controlled in the pilot house, and also with Benson electrically operated anchor capstans. An arrangement of particular interest, however, in the design of this float is in the electric controls in the pilot house, by means of which the propelling motors in the tug alongside can be operated from the pilot house of the barge, as well as from the pilot house of the tug. The twin rudders on the float and the single rudder on the tug can also be controlled from the bridge of the float or, alternatively, from the bridge of the tug. The steering gear and anchor capstan motors are also powered from the generators of the tug. The car float is towed by the tug alongside, which supplies all electricity via portable cables.

It is obvious, from the building of the float at Lorain and of the tug at Levis, that very careful and systematic consideration of the interconnecting controls was entailed, and the fact that these two units were each delivered separately to the service location and immediately went into operation with complete and effective synchronization is very much to the credit of the respective builders, and of the Canadian General Electric Co. and the Benson Electric Co. These vessels are now in regular service, displacing the old car ferry CHARLES LYON.

The designs of both vessels were prepared by Lambert & German, naval architects, Montreal, under the direction of M. McD. Duff, manager, Great Lakes steamship service, Canadian Pacific railway, the special electrical requirements being supervised by J. W. Hughes, electrical engineer, Canadian Pacific railway.

# What the British Are Doing in Shipbuilding

THE passenger and cargo motorship ANSHUN, built by Scott's Shipbuilding and Engineering Co., Greenock for the China Navigation Co., London, was launched at the end of October. The vessel which is 250 feet in length, represents an improvement on the ANKING and two sister ships which Scotts designed for the owners' native passenger and cargo trade between Singapore, Honk-Kong, Swatow and Amoy. The propelling machinery incorporates a new design of main engine developed by the builders. There is a six cylinder single acting heavy oil engine working on the two-stroke cycle with airless fuel injection. The cylinder liners are designed with thin walls reinforced by steel shrouds.

* * *

RIETBOK is the name of a twin screw suction hopper dredger launched by William Simons & Co., Renfrew, to the order of the South African Railways and Harbours administration. She is the largest dredge ever built on the Clyde and is intended for service at Durban. Having a hopper capacity of 5000 tons, the vessel included some special features to meet conditions at Durban, and she is fitted with Simon's patent hopper baffles.

* * *

WILLIAM BEARDMORE & CO. are ceasing to build ships, but our shutters are not going up." This statement was made by H. A. Reincke, chairman and managing director, following the launch of the POLE STAR, the last vessel to be built at the Dalmuir yard. In the engine shops, he said there was a volume of work in hand which would keep the yard busy and the men employed long after the yard had closed. They were concentrating on this work and on the products of the Parkhead forge and the diesel electric engine. The closing of the shipyard strengthened the company in building the road to success in other directions.

* * *

AN ORDER for a tank steamer of 14,000 tons has been received from American owners by Swan Hunter and Wigham Richardson, Wallsend. Work will shortly begin and will extend over nine months. This is a larger tanker than the majority ordered from the Tyne of late.

* * *

SHIP-REPAIRING is relatively steady on the north east coast of England, but the shipbuilding trade as a whole shows no improvement. During October only one ship was launched on the Wear, but a couple of barges for Sunderland corporation were also put into the water. For the ten months of this year, the total launches at Sunderland number 37 of 154,717 tons gross, against 43 of 180,396 gross tons in the corresponding period of last year. This year, however, the work in hand is considerably less.

* * *

THE launching output of Scottish shipyards in October was comparatively high, being more than double that for September. There were launched all over Scotland 21 vessels with an aggregate tonnage of 63,600 tons, compared with 16 vessels and 30,000 tons a month ago, and 28 vessels of 64,400 tons in October last year. Orders for new tonnage are few and the general trade position does not indicate an early improvement in the shipbuilding industry.

Of the 21 vessels, 18 were built and launched on the Clyde, the largest being the WORCESTERSHIRE of about 11,000 tons gross, a motor vessel built for the Bibby line by the Fairfield Shipbuilding & Engineering Co., Ltd. She is 502 feet long and driven by twin engines of the Fairfield-Sulzer type. The accommodation is for 286 persons, all first class passengers. The WORCESTERSHIRE is the fourth ship.

# Ice Breaking Tug T. L. Durocher

*Steel Tug T. L. Durocher Built by American Ship Building Co.*

THE T. L. DUROCHER powerful, single screw, steel tug for general towing, wrecking and ice breaking on the Great Lakes was completed at the Lorain plant of The American Ship Building Co. on Oct. 29. This tug was built to the special requirements of the owner, T. L. Durocher Co., Detour, Mich. John A. Smith of Smith Bros., Cleveland, served as consulting naval architect. Years of experience as general contractors in dock work, wrecking and salvage are reflected in the properties of this new towboat. The general dimensions are: Length overall, 125 feet; length between perpendiculars, 113 feet 2 inches; breadth molded, 28 feet; depth molded, 16 feet 6 inches; extreme draft, 12 feet 6 inches forward, 14 feet 6 inches aft; displacement, 680 short tons; gross tons, 319; net tons, 310. Scantlings are heavy and forward the frames are spaced 7½ inches. The bow is also raked and heavily plated for ice breaking. It is estimated that three feet and more in thickness of ice can be broken by this powerful tug. Though not classified, she is built equal to the requirements of either the American bureau or Lloyd's.

Propulsion is by means of a single propeller driven by a direct connected triple expansion steam engine with cylinders 17 x 25 x 43 inches by 30-inch stroke developing 1130 indicated horsepower at 125 revolutions per minute. Steam at a working pressure of 200 pounds per square inch is supplied by one Scotch boiler 15 feet in diameter by 11 feet 9 inches in length. There are three furnaces 43¾ inches in diameter. Each furnace is equipped with a Hoffman type of stoker on which slack coal is successfully burned under induced draft.

The propeller is four-bladed, 11 feet 0 inches in diameter and of 13 feet 0 inches pitch.

Deck equipment includes a towing machine, one lifeboat and one life raft and one wooden work boat with gasoline engine. The towing engine is 12 x 12 inches, steam driven and was built by the American Engineering Co. For wrecking purposes there is a 3½-ton boom served by a Lidgerwood steam winch 8¼ x 8 inches.

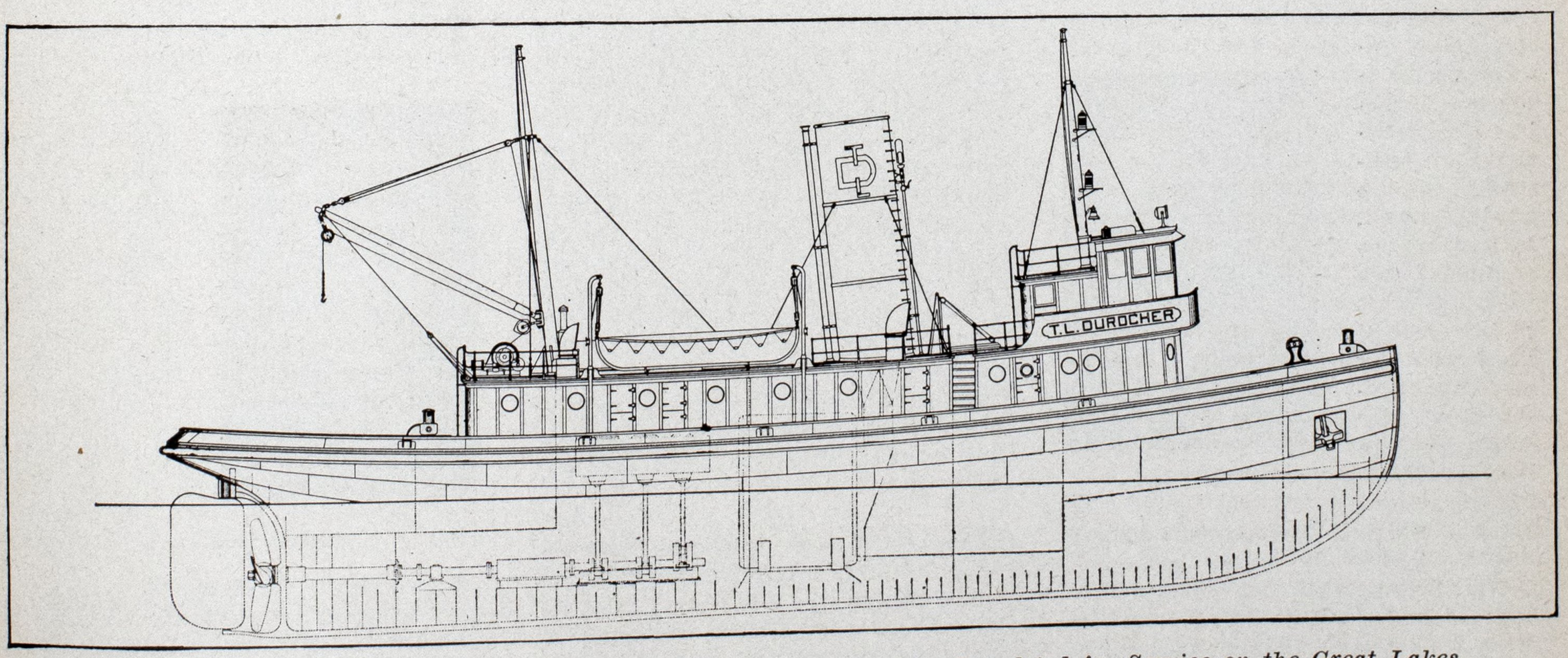
### Fully Equipped for Service

The steering engine is of the steam drum type with shaft transmission from the pilot house. The windlass capstan is of the steam worm geared type furnished by The American Ship Building Co. The anchor chain of forged iron one inch diameter and the 1200-pound anchor were furnished by Baldt Anchor Chain & Forge Co. The anchor is stowed in a recessed pocket on the starboard bow.

For navigational purposes the DUROCHER is fitted with a direction finder, wireless and the usual ship's magnetic compass. Quarters are provided in excess of the requirements. For ordinary operation there are eight men in the deck department and six in the engineer department. Quarters both forward and aft are fitted with mechanical ventilation which adds greatly to the comfort of the crew. Four 8-inch De Bothezat fans are installed. Rooms of the captain, chief engineer and two owners' staterooms are paneled in walnut in natural finish. The balance of the rooms are all paneled and painted. The galley and dining room are located aft.

A jet condenser of 20,000 pounds capacity, giving a 24-inch vacuum, was supplied by the Union Steam Pump Co. For culinary water there is a 30 gallons per hour Reilly distiller. Pumps include one 12 x 20 x 24 inches air pump, one 9 x 5 x 10 inches horizontal duplex main feed both furnished by Union Steam Pump Co. Pumps for various services were also supplied by Dean and Worthington.

All in all the DUROCHER is a powerful, strongly built, completely equipped sea going tug of excellent design, well adapted for the service required by the business of her owner. She can stand any weather and should prove very useful in keeping the channels free from ice which is a service often sorely needed late and early during the season.




*Outboard Profile of Powerful Steel Tug T. L. Durocher Recently Completed for Service on the Great Lakes*

## Millions Are Involved in Refrigeration Merger

ANNOUNCEMENT was made on Nov. 5 that the Brunswick-Kroeschell Co., of New Brunswick, N. J., and Chicago, one of the leaders in the marine refrigeration industry, will merge with the Carrier Engineering Corp., Newark, N. J., air conditioning engineers and constructors, and the York Heating & Ventilating Corp., Philadelphia. Including subsidiary and affiliated concerns, the merger will unite a total of 15 companies, five of them foreign, with total assets exceeding $15,000,000.

S. Carpender

"The consolidation will provide a single world-wide organization equipped to provide any desired kind of atmospheric conditions on steamships and in homes, hotels and apartment houses, stores, theatres, office buildings and industrial plants," Sydney Carpender, vice-president and general manager of the Brunswick-Kroeschell Co., stated. The companies in the merger will retain separate entities under a holding company to be known as the Carrier Corp. All refrigerating and air conditioning aboard ships will be handled entirely through the marine department of the Brunswick-Kroeschell Co. under the management of R. I. Tomlinson. Brunswick-Kroeschell will now have the additional benefit of the research, engineering and manufacturing facilities of the Carrier and York organizations. The consolidation brings to the Brunswick-Kroeschell family of refrigerating machines the Carrier centrifugal refrigerating unit with its possibilities for application in the marine field. It also makes available the York unit coolers and the Carrier unit air conditioners for employment in the preservation of cargo and the comfort of passengers aboard ship.

W. H. Carrier

The Brunswick-Kroeschell Co. has been identified with marine refrigeration from the beginning. As early as 1900 it installed a two and one-half ton refrigerating machine on the steamer AMERICAN of the American Hawaiian line, which is said to have been the first ice machine ever applied for exclusive crew service on an American ship. In 1908 it installed two 8-ton machines on the steamer HONOLULAN for cooling 20,000 cubic feet of banana cargo space by forced air circulation and in 1912 equipped six vessels of the American Hawaiian line in the citrus trade each with 70,000 cubic feet of cooled storage space by forced air circulation. To date more than 3,000 American vessels have been equipped with refrigeration machinery by the Brunswick-Kroeschell Co. which was the outgrowth of the merger in 1922 of Brunswick Refrigerating Co. of New Brunswick, N. J. and the Kroeschell Brothers Ice Machine Company of Chicago.

The Carrier Engineering Corp. is known for "manufactured weather."

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## Hamburg-American Line Executive to Resign

AFTER 42 years of continuous service with the Hamburg-American line, Julius P. Meyer, member of the company's New York board of directors, recently asked to be relieved from active participation in the business on June 1, 1931. He will be succeeded by Dr. A. Scheurer, member of the Hamburg board of directors whose appointment to a similar position on the New York board was announced recently.

Julius P. Meyer

Together with Emil Lederer and Christian J. Beck, Mr. Meyer has in recent years conducted the activities of the Hamburg-American line in the United States and Canada. Mr. Lederer and Mr. Beck will continue as members of the New York board in charge of passenger and freight operations respectively, while Dr. Scheurer will be in charge of financial and accounting matters.

During his long service Mr. Meyer has witnessed the growth of the Hamburg-American line up to the World war, its trials during the war and its rehabilitation in the last decade.

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Captain W. H. Christian, 89, designer of river gun boats on which he served during the Civil war and later designer of a snag boat operated on the Ohio by the government, died Oct. 27 at his home in Cincinnati, O.

## Sperry Company Announces Three Staff Promotions

ANNOUNCEMENT was made on Nov. 18 by R. E. Gillmor, vice president of the Sperry Gyroscope Co. Inc., of the appointment of O. B. Whitaker as assistant manager of the marine department. Mr. Whitaker has been with the Sperry company since 1913, having joined it from the navy, where he received his training. During his 17 years of service, he has seen the company expand from an organization of some 20 men in a small rented shop, to an international organization with factories in England, Japan and the United States, enjoying a world wide government and merchant marine business. He has been engaged in various departments of the company having helped to organize the service and inspection departments, and later the Gyro school, as well as sales work on the Great Lakes and Canada.

O. B. Whitaker

For the past five years, Mr. Whitaker has had charge of the publicity department, covering all the company's advertising, publicity and publication work. During the war he had numerous experiences of interest in connection with the installation of Sperry equipment on vessels of the foreign Navies.

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## Pursues Research Work in Steel Nitriding Process

THE tremendous advance which has been made in the development of non-corroding steel during the last two or three years and more particularly during the past few months is of great interest to the shipbuilding industry. The Nitralloy Corp., 52 Broadway, New York, announces that it has engaged the services of Dr. Victor O. Homerberg to act as its technical director, effective Nov. 1. The Nitralloy Corp. controls through assignment by Aubert & Duval, Paris, many United States patents.

Dr. V. O. Homerberg

# Wider Use of Electric Power for Propelling Ships

BY D. W. NIVEN

PROGRESS made in the turbine electric and diesel electric fields of propulsion was greater than during any previous year.

Eight turbine electrically propelled ships were equipped by the General Electric Co. and its affiliated company, the British Thomson Houston Co., during the year, and work was started on ten additional powering equipments for ships to be launched during 1931. The eight propelling plants completed had a total of 75,100 horsepower, and the equipments building, 161,500 horsepower.

The year's gains in the diesel electric drive field are equally as impressive as those made in the turbine electric field. Propelling equipments in which the General Electric Co. and its associate company furnished the electric equipment were completed for 22 boats having a total horsepower of 15,105. Prior to 1928 the total installations made by the two companies numbered but 34 with a total horsepower of 29,490. During 1928 and 1929 inclusive eleven boats were added, having a total horsepower of 9500.

Interpreting the trends of the year is much easier than in the past because of the concrete evidence of growth. Prior to the commissioning of the S. S. CALIFORNIA in 1928 the total turbine electric horsepower installed on merchant ships was but 38,800. The horsepower added by years since then have been as follows: 1928, 34,000 horsepower; 1929, 43,800 horsepower; 1930, 78,100 horsepower; building during 1930 for completion in 1931, 161,500 horsepower. Although turbine electric drive was highly developed for naval service prior to 1927, it is comparatively new in the merchant field. Out of a total of 356,200 horsepower, completed and in course of construction to date, 317,400 horsepower, or 89 per cent, has been undertaken during the past three years.

The turbine electric combination passenger and freight ship SANTA CLARA was placed in the New York-South American trade route by the Grace line on April 10. This vessel, which was the fastest electric liner built at the time of her launching, succeeded in making the run between New York and Cristobal in four days and 13 hours, establishing a new record for merchant craft between those two ports. The maintained speed was above 21 knots and the reduction in time, over the company's previously maintained schedules, 36 hours. The SANTA CLARA, which is 504 feet long with accommodations for 600 passengers and 6000 tons of freight, is a twin-screw vessel of 12,600 horsepower rating. The auxiliaries, with few exceptions, are electrically driven, and electricity is also used for cooking and other miscellaneous purposes aboard the ship.

The MORRO CASTLE and ORIENTE, new turbine electric passenger liners of the Ward line, started on their maiden voyages from New York to Havana, Cuba, on Aug. 23 and Dec. 17 respectively. Both ships had no difficulty in reducing the running time between ports to 60 hours, a saving of 12 hours over the schedule maintained with the company's older ships.

The CITY OF FLINT, sister ship of the CITY OF SAGINAW, which was commissioned last year, went into service during the year. Both are twin screw, turbine electrically propelled car ferries of 7200 shaft horsepower rating, capable of making 18 miles an hour service speed. They are owned by the Pere Marquette railroad and were built especially to reduce shipping time on the Great Lakes. Each boat has a capacity of 28 cars, 42 feet in length. The ship can be used for ice breaking during the winter months. The main propelling units also supply power for the auxiliaries, which have a total connected load rating of 600 horsepower.

The yacht CORSAIR was commissioned during the year. It is palatial in every respect and the largest private yacht ever built in the United States. Electrically powered throughout, it is said to be visioned ahead for 50 years. The main power plant consists of two turbine generators, which supply power for both main and auxiliary purposes.

The turbine electric ship equipments completed by the British Thomson Houston Co. were for the DARIEN (ex LA MAREA), a ship of 3300 shaft horsepower, and the MUSA and PLATANO, ships of 7000 shaft horsepower. All three vessels were for the account of the United Fruit Co.

The General Electric Co. is constructing the turbine electric propelling equipments for one ship of 26,500 horsepower rating for the Dollar line, and six ships of 11,000 horsepower each for the United Mail Steamship Co. The British Thomson Houston Co. is proceeding with the turbine-electric propelling equipments for the new P. & O. liners STRATHAIRD and STRATHNAVER, which are to be rated 28,000 shaft horsepower each, and one equipment of 13,000 shaft horsepower for a liner yet unnamed for the Union S. S. Co. of New Zealand.

The lightships, Nos. 115, 116 and 117, named respectively the FRYING PAN, FENWICK ISLAND and NANTUCKET, were commissioned during the year. Like the BLUNTS, SWIFTSURE and FIRE ISLAND launched last year, they have installed four small diesel engine-driven generating sets, all or part of which may be used to drive the propelling motor. The shaft horsepower rating of each of these craft is 350.

The survey boat LISTON and the lighthouse tender LINDEN are both diesel electric drive. The latter is the first of its type to adopt diesel electric drive. The rating of the former is 350 shaft horsepower and of the latter, 240 shaft horsepower.

The tanker VEEDOL, sister ship of the TIDEWATER which was launched last year, was commissioned during the year. Its power plant is rated 1000 shaft horsepower.

Three tankers were completed for the Lake Tankers Corp., each of 500 shaft horespower rating. They were named the L. T. C. No. 1, L. T. C. No. 2, and L. T. C. No. 3.

The government-owned stern wheel towboats SCOTT and FT. ARMSTRONG, each rated 150 horsepower and having connection between the motor and paddle wheel made by chain drive, were also completed during the year.

Four harbor tugs of the propeller type, each rated 800 shaft horsepower, were completed for the Erie railroad. They were named the CLEVELAND, ROCHESTER, SCRANTON and OLEAN. Two tugs of 515 horsepower rating were also completed for the Mystic S. S. Co., named the VENUS and LUNA. The PRESCOTONT, owned by the Canadian Pacific railroad, a tug of 800 shaft horsepower, was also placed in service. The PRESCOTONT has created quite a little interest because of the flexibility of her control. The tug, which is to be used in shunting car ferries, can be controlled from the car float, pilot house of the tug, or engine room of the tug, as desired.

Two small electric drives were also completed for sailing yachts to be used as an auxiliary power in calms.

The British Thomson Houston Co. furnished the electric equipment for two tankers, named the PERMIAN and WINKLER, which are similar to the BRUNSWICK, and are for the account of the Atlantic Refining Co. These craft are each rated 2800 shaft horsepower.

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The author, D. W. Niven is manager of the federal and marine department of the General Electric Co. The above is an abstract of a review by him of the growing application of electric power to ship propulsion.

## Commodore of Cunard Line Retires from Service

WHEN the S. S. BERENGARIA docked at Southampton on Nov. 4, Sir Arthur Rostron, master of the vessel and commodore of the Cunard fleet, retired, having passed the age of 61 last May. He had spent 35 years of active service with the line.

Commodore Rostron is probably best known for his heroism in connection with the TITANIC disaster in 1913 As master of the CARPATHIA he picked up the distress signals of the ill-fated White Star liner and hastened to the scene taking on board hundreds of passengers from the TITANIC, which was rapidly filling with water. He was honored by the United States for his heroic work with the Congressional medal and received a letter of appreciation from President Taft.

**Arthur Rostron**

In 1924 Commodore Rostron received the highest mark of recognition open to his profession by being appointed a Royal Naval Reserve aide-de-camp to King George. As master of the MAURETANIA in the same year he broke both the eastward and westward trans-Atlantic records in one round trip. He is an officer in the Royal Naval Reserve, being commissioned as commander in 1912. He holds the royal decoration for long service and the South African Transport medal for the safe conveyance of troops to South Africa during the Boer war. For his notable services in the World war he was appointed Commander of the British Empire.

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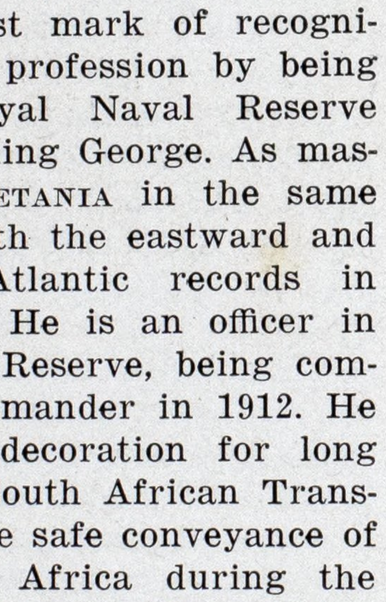
## Captain Latta to Command New Empress of Britain

CAPTAIN R. G. LATTA, familiarly known to thousands of transatlantic passengers as "Jock" Latta, has been selected to command the new 42,500-ton Canadian Pacific liner EMPRESS OF BRITAIN, it was announced on Nov. 6. This promotion comes to Captain Latta after 26 years of service with the Canadian Pacific, which company he joined in 1904 with the rank of fourth officer. In the next six years Captain Latta passed through several ships and became chief officer of the MONTEZUMA in 1910. Seven years later he was promoted to his first command, the MONMOUTH, and in 1923 to the EMPRESS OF BRITAIN, later re-named the MONTROYAL. After a short interlude on the EMPRESS OF SCOTLAND he took command of the EMPRESS OF AUSTRALIA, which command he relinquished in order to stand by the new EMPRESS OF BRITAIN during the last stages of her construction.



**Capt. R. G. Latta**

His new command will give Capt. Latta a ship that has been heralded as one of the world's most luxurious liners. The prediction is being made that in addition to lowering all records between Great Britain and Canada by making the passage from Southampton to Quebec in less than five days, the EMPRESS OF BRITAIN will bring central Canada and the mid-western states almost two days closer to Europe than is possible by any other ship.

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## I. M. M. Executive Will Retire at End of Year

Announcement was made on Nov. 6 by P. A. S. Franklin, president of the International Mercantile Marine Co., that John H. Thomas, vice president, will retire on Dec. 31 next, owing to poor health. Although Mr. Thomas in recent years has devoted most of his attention to the operating end, his experience has covered all branches of the shipping business, including freight, passenger and operating.

Mr. Thomas is a native of Maryland and has been identified with shipping his entire life. He joined Furness, Withy & Co. in Baltimore, going to New York in 1896 when the company extended its activities to that port. He became associated with the Atlantic Transport Co. in 1898 as assistant to Mr. Franklin, manager of the New York office, and soon thereafter was appointed New York manager of the line.

When the Atlantic Transport line was absorbed by the International Mercantile Marine Co., Mr. Thomas became freight and later operating manager of that company, and in 1910 moved to Boston as manager of the company's offices there. In 1917 he returned to New York on his election as vice president of the company. He was appointed a director in 1921.

During 1918 Mr. Thomas was made director of shipping, Port of New York, and as such had charge of the loading and dispatch of all steamers carrying supplies from New York to the American and allied armies in France.

## Assume Additional Duties for Agwi Group

EFFECTIVE Nov. 17, the duties of M. Seckendorf, for many years passenger traffic manager of the New York & Porto Rico Steamship Co., have been extended to include those of passenger traffic manager for the Ward line, a position recently made vacant by the resignation of A. G. Heinsohn.

**M. Seckendorf**

Announcement to this effect was at the offices of the Atlantic Gulf & West Indies Steamship lines, parent company of the Ward and Porto Rico lines. At the same time it was stated that the duties of William C. Campbell, general passenger agent of the Ward line, have been extended to include those of general passenger agent for the New York & Porto Rico Steamship Co.

Both Mr. Seckendorf and Mr. Campbell are well known in the shipping world by reason of their many years of association with the companies which form part of the Agwi group. They will, of course, continue to maintain their offices at the company's headquarters at the foot of Wall street, New York.

Mr. Seckendorf began his shipping career in 1897 when he joined the passenger department of the Hamburg American line as an office boy. He left this company in January of 1899 to accept a position as junior clerk with the Porto Rico line, then an independent company located at 132 Pearl street. In those days the Porto Rico line's fleet consisted of one small vessel, the old ARKADIA, which had accommodations for 30 passengers. Today the company's fleet consists of six liners.

Mr. Campbell entered the shipping field in 1907 when he accepted a position with the old Maine Steamship Co. He joined the Clyde-Mallory lines, another Agwi subsidiary, in 1909 and, save for a brief period in 1911, he has been associated with the Agwi lines ever since. He left the Clyde-Mallory lines in 1918 to become general passenger agent of the Ward line.

**W. C. Campbell**

# Convert Shipping Board Ship to Floating Power Station

THE JACONA, the first successful conversion of a ship into a floating power plant, capable of generating 20,000 kilowatts, will shortly be placed in service by the New England Public Service Co. of Augusta, Me.

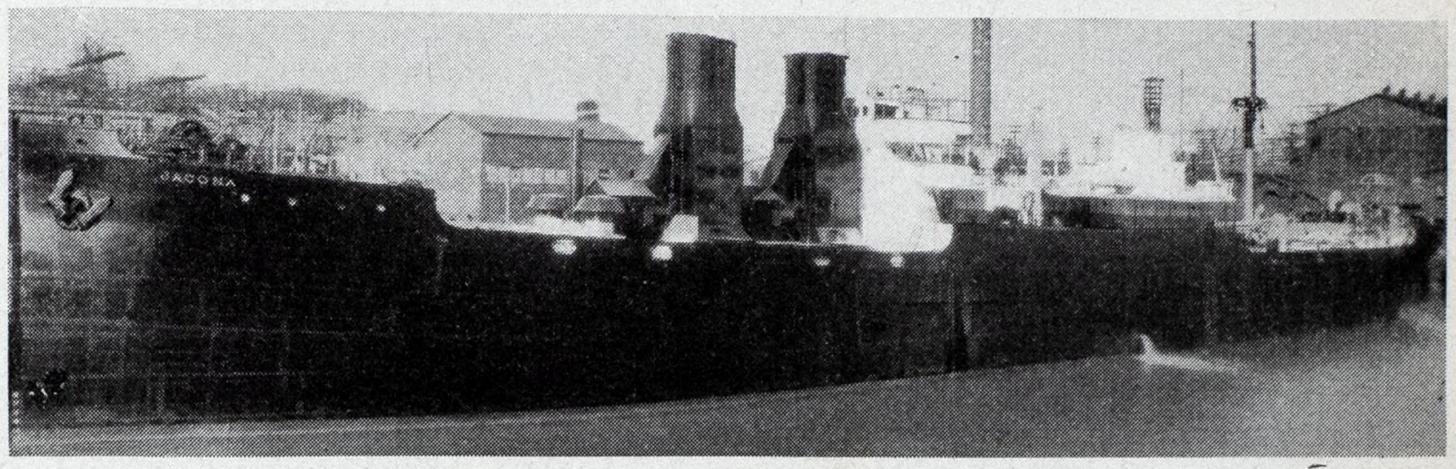
The JACONA, purchased from the shipping board by the New England Public Service Co., was a former single screw, two-deck, three-island type cargo steamer of 5128 gross tons, built in May, 1919 by Todd Dry Dock and Construction Co., of Tacoma, Wash., for the United States shipping board.

In order to accommodate the installation of new machinery, it was necessary to remove the main engine and boilers, and the engine room and boiler room auxiliaries. The stack, foremast and four forward deck winches were also removed. The shaft alley, line shaft, tail shaft and propeller were removed and the stern bearing was blanked by bolted plates outside and inside. A new watertight bulkhead was installed at the forward end of the tailshaft recess with a watertight door for access to the inside bolted plate on the stern bearing.

In the double bottoms, stiffeners were fitted to receive the foundations for new machinery. The strongbacks in Nos. 1, 2 and 4 'tween deck hatches were removed and watertight doors were installed for access between the machinery spaces. New foundations were installed to accommodate the new equipment.

The maximum capacity of this plant will be 20,000 kilowatts and consists of four boilers, which will furnish steam for two turbo generators, each rated at 10,000 kilowatts. Practically all of the original cargo and machinery spaces are occupied by the new equipment. Near the forward end of the ship is a cargo space which is occupied by a donkey boiler and coal bunker. This boiler furnishes steam for heating purposes and for operating steam driven auxiliaries, such as pumps and steering gear, when the ship is being towed. Aft of this is another cargo space which constitutes the boiler room. Here the second deck has been practically removed to make room for the boilers, which extend to the main deck. In addition to the boilers, the following auxiliaries are installed in this space: two motor driven boiler feed pumps, one turbine driven boiler feed pump, two fuel oil service pumps, three fuel oil heaters, one fuel oil transfer pump, one bilge pump, besides numerous meters and gages.

The boiler equipment consists of four Babcock and Wilcox marine type boilers equipped with air preheaters, interdeck superheaters and Diamond soot blowers. These boilers deliver 280,000 pounds of steam per hour at 425 pounds pressure and 250 degrees Fahr. superheat. Each boiler is equipped with eleven B. & W. Cuyama burners. The fuel oil is supplied to the burners at approximately 300 pounds pressure and 300 degrees temperature. Auxiliary steam is taken from two of the boilers through desuperheating coils. This steam is used for heating the fuel oil and for operating the steam driven auxiliaries. The furnace walls consist of a high grade fire brick and special insulation. There is one stack, one forced draft fan and one induced draft fan for each pair of boilers. The fans are equipped with variable speed alternating current motors, which are controlled from the boiler room floor.



*The Former Shipping Board Freighter Jacona Converted to Floating Power Station by Newport News Shipbuilding & Dry Dock Co.*

This boiler plant is designed to operate at high efficiency.

Near the center of the ship, and between the boiler rooms and engine rooms are four built-in steel fuel oil tanks, having a total capacity of approximately 900 tons of fuel oil, or enough to supply the plant about five days at full capacity. These tanks have been reconditioned.

On the second deck level over the fuel tanks are two high pressure feed water heaters. A surge tank, which is in the boiler feed suction line, is also located in this space.

Aft of the oil tanks is the old boiler and engine room. The dividing bulkhead has been removed and this entire space is occupied by one of the 10,000 kilowatt turbo generator sets with its auxiliaries. Next comes a cargo space which is occupied by the second 10,000 kilowatt turbo generator sets with its auxiliaries.

The turbines are General Electric Co. standard power house machines of the very latest design and are of high efficiency. They operate at 3600 revolutions per minute on 400 pounds steam pressure and 250 degrees superheat, exhausting into a Westinghouse surface condenser at 1 inch—absolute back pressure. With these steam conditions, steam consumption of the turbine alone is approximately 9.4 pounds per kilowatt at full load.

The turbines are directly connected to the generators which have a closed system of ventilation. Cooling water for the air coolers and lubricating oil coolers is supplied by the main circulating water pump.

The condensing equipment was furnished by the Westinghouse Electric and Manufacturing Co. The condensers are of the single pass type and the tubes are expanded at both ends. Each condenser is located under the turbine which it serves and is suspended from the turbine exhaust flange. The main circulating water is taken from a tunnel extending athwartship so that water may be taken in from either side of the ship.

The generators are built for either 11,000 volts "Y" or 6600 volts delta. Leads are brought out from each winding and carried to the Allis Chalmers Reyrolle oil circuit breaker units where the change over can be made from 11,000 volts to 6600 volts or the reverse, through a plug type carriage.

The switchboard equipment is the General Electric commercial type treated for marine installation.

Most of the auxiliaries are motor driven, but there are enough steam driven units to enable the station to start up if there should be a break in the transmission lines and it should become necessary to start the plant without assistance from shore current.

The method of making electric connections to the shore has been a problem involving considerable study. The arrangement finally decided upon consists of a steel tower on the dock and one on the port side of the ship, built on the main deck about in line with the center of the switchboard room. Arrangement has been made to transfer this tower to the opposite side whenever necessary. Two separate three-phase circuits consisting of heavily armored and insulated cable will run up these towers and over a barrel cross arm structure to the dock tower. A considerable amount of slack will be left in the cable between these towers to compensate for a normal tidal rise and fall of 10 feet and a maximum of 18 feet.

# Late Decisions in Maritime Law

## Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
*Attorney at Law*

THE owner of a barge, carrying only coal under a bill of lading which was little more than a shipper's receipt provided, not by the vessel, but by the owners of the cargo, was not a common carrier, but merely a bailee to transport for hire, in order to recover from whom for loss of cargo, libelant must show negligence. This is true, though the bill of lading excepts liability for dangers of the sea.—WILLIAM I. MCILROY, 37. F. (2d) 909.

* * *

THE implied warranty of seaworthness of a chartered vessel was held, in the case of Patton-Tully Transportation Co. v. Barrett, 37 F. (2d) 516, not affected by an express warranty in the charter party against a possible break in the weld of the shaft, nor by the character's inspection of the vessel after consummation of the charter party, in the absence of an express or implied provision requiring such inspection, which did not disclose the extent of the deterioration of floor frames causing unseaworthiness. It was also declared by the court that such implied warranty was not affected by a provision of the charter party that the charterer might return the vessel and cancel the charter party after 30 days if it failed to meet the charterer's needs, such provision assuming seaworthiness, and the evidence further showing that unseaworthiness was not established within 30 days.

* * *

THE Harter act, it was pointed out in the case of JOSEPHINE, 37 F. (2d) 928, deals with the subject of the reciprocal duties and rights of common carriers by sea. It imposes upon shippers and carriers a policy of the law. It seeks to distinguish between those risks of loss from which shippers should protect themselves by insurance and those for which they can look for protection to the carrier vessel and its owners. It changes the general obligation of the carrier from that of safe carriage to that of due diligence in providing efficient instrumentalities by enacting that, if this duty of due diligence is performed, the carrier vessel and owners are exempted from liability for the casualties due to perils of the sea and the results of errors of navigation. Incidentally, it forbids the carriers to relieve themselves by contract of the responsibility imposed upon them by law. The phrase "perils of the sea" does not lend itself to accurate definition. "It has always (with exceptions)," said the court, "been open to any one charge with negligence or with nonperformance of a convenant to introduce the defense of vis major, acts of Providence, and the like. Perils of the sea must in consequence mean something else when used in charter party or Harter act exemptions from liability. This schooner encountered storms of such severity as to be called 'hurricanes.' Any one would list hurricanes among the perils which await those who go down to the sea in ships. Is a hurricane any more or less a peril because of the circumstance that it was to be expected or not expected on a particular voyage? Winds blow at all times, and it is clear enough that a blow, if no more than vessels meet on every voyage, would not be classed as a peril of the sea. None the less, the peril lies, not only in the blow, but just as really in the absence of skill in the handling of the vessel or in the place or conditions at and under which encountered. The real cause of a loss met during a storm might thus be due, not to the storm, but to errors in navigation which put the vessel in a position of danger. A storm when encountered in the open sea, where there was plenty of sea room, might not be reckoned a peril when the same storm or a less one which struck the vessel when near the breakers of a lee shore might be deemed to be a real peril. The degree of violence of the storm is in consequence not the sole or even the real test of what is a peril of the sea. Again, if a storm of great and unexpected violence was encountered by which a seaworthy vessel was swamped and foundered, the loss of ship and cargo would unhesitatingly be ascribed to a peril of the sea, but, if the ship by skillful handling so far weathered the storm as not to founder, but the buffeting strain to which she was subjected opened her seams, and the cargo was thereby damaged, the real cause of the damage would be the same."

* * *

THE duty of supplying a light for carpenters repairing a steamship lying at dock is on the independent contractor and not on the shipowner. And where a carpenter employed by an independent contractor, after completing work, on his way past an open hatch in darkness, struck against a cleat on the floor, and fell, sustaining injuries to his person, the shipowner was not liable; there being no relationship.

* * *

IN ORDER for a tug to complete its duty as bailee of a barge, it had to make delivery of the barge at a berth apparently safe and in a position apparently secure, said the court in the case of JAMES MCCUE, 37 F. (2) 934. The wharfinger, it was declared, is liable for damage to a vessel due to an uneven bottom at a wharf which it holds out as wharfinger to be a safe place to moor, or in respect of which it does not give warning by posting a notice or otherwise to the vessels which would ordinarily use it.

* * *

IN ORDER for assumption of risk to constitute a defense to an action by a seaman for damage for personal injuries incurred in the scope of his employment, under the Merchant Marine act of 1920, the act of the seaman in assuming the risk must have been voluntary and not under restraint.—In re Eastern Transportation Co., 37 F. (2d) 355.

* * *

IF NOTHING is said as to loss from delay to owners of a ship which is chartered or of owners of the cargo, the obligation of the ship is to tender her services within a reasonable time after she is hired, and of the shipper to accept her services within a reasonable time after they are tendered, and the pay begins from the time of this acceptance.—AVART FOND, 38 F. (2d) 874.

* * *

A VESSEL proceeding downstream in New York harbor, which sighted a tug nearby apparently crossing her path, was under duty to stop, where her signals were disregarded by the tug, in view of the uncertainties of the tug's movements, and it was negligent for the master of the vessel to increase her speed in the presence of such danger. The law imposes a rigid obligation on a moving vessel to maintain a careful, vigilant, and effective lookout, whose duty should be both to observe and to report. The lookout on a large passenger vessel must properly be stationed forward, and not on the bridge.—PARIS, 37 F. (2d) 734.

* * *

IT IS settled that under the Jones-White merchant marine act a seaman may recover for injuries received in the course of his employment resulting from the negligent failure of the owner of the vessel to provide suitable and safe appliances or equipment. There is nothing in the text of the act, said the court in the case of Slaney v. Cromwell, 38 F. (2d) 304, that warrants a different conclusion when the action is to recover for the death of an employe, nor is there any reason, in principle, why a different rule should apply.

# Marine Business Statistics Condensed

## Record of Traffic at Principal American Ports for Past Year

### New York

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 530 | 2,546,629 | 548 | 2,636,414 |
| September | 591 | 2,877,309 | 556 | 2,693,493 |
| August | 554 | 2,716,668 | 586 | 2,855,323 |
| July | 578 | 2,717,787 | 616 | 2,815,336 |
| June | 585 | 2,722,344 | 559 | 2,596,692 |
| May | 592 | 2,697,642 | 643 | 2,955,826 |
| April | 558 | 2,662,532 | 574 | 2,601,047 |
| March | 546 | 2,490,027 | 562 | 2,470,228 |
| February | 508 | 2,280,543 | 512 | 2,272,393 |
| January, 1930 | 542 | 2,506,444 | 572 | 2,658,125 |

### Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 85 | 231,460 | 53 | 144,530 |
| September | 87 | 232,781 | 52 | 147,365 |
| August | 92 | 244,206 | 55 | 144,201 |
| July | 96 | 246,866 | 68 | 151,861 |
| June | 92 | 240,323 | 72 | 169,627 |
| May | 105 | 271,618 | 64 | 143,167 |
| April | 89 | 236,257 | 63 | 177,289 |
| March | 96 | 285,754 | 58 | 190,093 |
| February | 86 | 248,417 | 67 | 194,809 |
| January, 1930 | 94 | 281,558 | 66 | 202,453 |

### Boston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 96 | 321,092 | 65 | 208,695 |
| September | 118 | 347,974 | 85 | 249,605 |
| August | 115 | 305,649 | 101 | 299,454 |
| July | 152 | 325,325 | 110 | 222,555 |
| June | 152 | 325,325 | 110 | 222,555 |
| May | 163 | 362,849 | 114 | 274,019 |
| April | 105 | 298,347 | 76 | 203,497 |
| March | 85 | 271,423 | 57 | 193,317 |
| February | 87 | 281,012 | 44 | 159,767 |
| January, 1930 | 93 | 306,097 | 42 | 128,581 |

### Portland, Me.

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 17 | 41,667 | 20 | 45,989 |
| September | 32 | 53,423 | 28 | 49,428 |
| August | 36 | 69,765 | 36 | 72,282 |
| July | 42 | 83,987 | 42 | 84,939 |
| June | 39 | 70,119 | 34 | 60,536 |
| May | 31 | 46,797 | 33 | 52,619 |
| April | 17 | 47,308 | 20 | 52,313 |
| February | 26 | 71,155 | 21 | 57,834 |
| January, 1930 | 27 | 72,734 | 26 | 71,929 |

### Providence

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 10 | 37,269 | 5 | 22,305 |
| September | 6 | 28,972 | 3 | 16,265 |
| August | 7 | 29,532 | 4 | 16,388 |
| July | 10 | 36,403 | 5 | 19,623 |
| June | 6 | 26,588 | 4 | 18,640 |
| May | 7 | 28,953 | 6 | 23,794 |
| April | 10 | 44,564 | 6 | 24,407 |
| March | 7 | 31,668 | 5 | 23,382 |
| February | 12 | 44,382 | 7 | 28,774 |
| January, 1930 | 13 | 48,880 | 5 | 24,055 |

### Portland, Oreg.

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | | | | |
| September | 30 | 122,022 | 46 | 182,641 |
| August | 32 | 125,137 | 46 | 174,985 |
| July | 30 | 118,919 | 53 | 193,425 |
| June | 31 | 122,569 | 48 | 175,167 |
| May | 32 | 122,714 | 49 | 179,845 |
| April | 32 | 121,646 | 46 | 167,358 |
| March | 26 | 103,710 | 44 | 159,420 |
| February | 31 | 123,100 | 47 | 185,192 |
| January, 1930 | 31 | 122,031 | 44 | 165,208 |

### Baltimore

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 139 | 452,905 | 127 | 402,155 |
| September | 150 | 475,928 | 138 | 424,976 |
| August | 130 | 412,209 | 125 | 396,421 |
| July | 132 | 444,823 | 144 | 455,226 |
| June | 153 | 486,645 | 157 | 481,837 |
| May | 152 | 457,169 | 150 | 463,958 |
| April | 166 | 502,204 | 179 | 529,912 |
| March | 141 | 438,638 | 139 | 433,168 |
| February | 139 | 432,422 | 142 | 431,664 |
| January, 1930 | 131 | 422,932 | 135 | 435,506 |

### Norfolk and Newport News

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 21 | 72,517 | 58 | 153,410 |
| September | 21 | 48,971 | 66 | 168,922 |
| August | 28 | 66,765 | 50 | 139,710 |
| July | 27 | 63,721 | 60 | 144,446 |
| June | 23 | 52,701 | 43 | 109,274 |
| May | 28 | 58,214 | 53 | 131,768 |
| May, 1930 | 28 | 58,214 | 53 | 131,768 |
| April | 14 | 35,914 | 61 | 178,792 |
| February | 21 | 47,835 | 59 | 180,510 |
| January, 1930 | 13 | 27,927 | 75 | 208,959 |

### Jacksonville

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 14 | 27,810 | 14 | 27,016 |
| September | 12 | 26,442 | 13 | 26,356 |
| August | 15 | 29,565 | 12 | 20,856 |
| July | 6 | 14.312 | 8 | 20.739 |
| June | 10 | 25,129 | 12 | 23,737 |
| May | 14 | 32,001 | 19 | 51,210 |
| April | 13 | 23,378 | 13 | 27,999 |
| March | 17 | 26,625 | 12 | 23,963 |
| February | 14 | 35,002 | 13 | 31,353 |
| January, 1930 | 12 | 24,225 | 16 | 31,722 |

### Key West

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 50 | 61,288 | 49 | 60,432 |
| September | 48 | 64,968 | 48 | 64,742 |
| August | 50 | 61,440 | 50 | 61,666 |
| July | 56 | 68,968 | 55 | 69,397 |
| June | 57 | 69,679 | 56 | 68,653 |
| May | 104 | 120,788 | 108 | 120,160 |
| April | 89 | 90,105 | 82 | 90,249 |
| March | 93 | 89,490 | 76 | 86,235 |
| February | 85 | 90,050 | 70 | 87,109 |
| January, 1930 | 74 | 86,081 | 71 | 85,990 |

### Mobile

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | | | | |
| September | 83 | 184,276 | 81 | 171,679 |
| August | 102 | 190,362 | 96 | 176,488 |
| July | 113 | 211,989 | 95 | 173,549 |
| June | 113 | 211,446 | 111 | 212,639 |
| May | 98 | 169,700 | 106 | 203,070 |
| April | 115 | 225,516 | 119 | 235,115 |
| March | 131 | 280,484 | 126 | 286,119 |
| February | 104 | 254,408 | 116 | 276,137 |
| January, 1930 | 118 | 281,672 | 108 | 256,384 |

### Seattle

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 57 | 246,957 | 63 | 272,114 |
| September | 62 | 268,203 | 58 | 250,301 |
| August | 48 | 200,602 | 48 | 209,109 |
| July | 54 | 248,954 | 60 | 261,746 |
| June | 49 | 215,525 | 53 | 228,554 |
| May | 54 | 235,178 | 53 | 222,715 |
| April | 55 | 230,429 | 55 | 217,705 |
| March | 52 | 205,674 | 59 | 245,363 |
| February | 55 | 231,213 | 47 | 195,156 |
| January, 1930 | 51 | 229,516 | 55 | 246,266 |

### New Orleans

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | | | | |
| September | 210 | 589,459 | 218 | 605,239 |
| August | 220 | 600,786 | 241 | 666,625 |
| July | 270 | 697,526 | 245 | 653,562 |
| June | 233 | 606,340 | 239 | 626,307 |
| May | 260 | 686,543 | 251 | 662,383 |
| April | 226 | 712,630 | 261 | 701,159 |
| March | 255 | 703,361 | 263 | 699,493 |
| February | 263 | 715,681 | 237 | 630.673 |
| January, 1930 | 252 | 706,945 | 260 | 715,903 |

### Charleston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net. tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | | | | |
| September | 19 | 54,863 | 19 | 69,530 |
| August | 13 | 34,274 | 13 | 24,742 |
| July | 25 | 70,538 | 25 | 51,805 |
| June | 18 | 42,196 | 18 | 46,140 |
| May | 20 | 50,484 | 20 | 50,484 |
| April | 22 | 49,651 | 26 | 56,022 |
| March | 32 | 70,250 | 24 | 60,834 |
| February | 20 | 52,660 | 18 | 44,494 |
| January, 1930 | 25 | 61,031 | 22 | 58,857 |

### Galveston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | | | | |
| September | 46 | 117,185 | 119 | 337,091 |
| August | 37 | 82,429 | 97 | 277,077 |
| July | 40 | 93,999 | 83 | 249,064 |
| June | 28 | 60,622 | 63 | 171,223 |
| May | 35 | 59,807 | 82 | 240,137 |
| April | 26 | 39,332 | 66 | 183,706 |
| March | 24 | 31,987 | 82 | 235,656 |
| February | 26 | 48,200 | 68 | 197,140 |
| January, 1930 | 30 | 77,176 | 87 | 274,299 |

### Los Angeles

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 236 | 680,430 | 217 | 628,733 |
| September | 255 | 697,262 | 218 | 616,018 |
| August, 1930 | 211 | 631,167 | 221 | 621,088 |
| July | 230 | 687,670 | 196 | 611,768 |
| June | 240 | 632,188 | 225 | 641,270 |
| April | 214 | 639,153 | 200 | 637,922 |
| March | 211 | 682,547 | 218 | 677,011 |
| February | 177 | 580,092 | 165 | 542,392 |
| January, 1930 | 185 | 601,710 | 176 | 596,007 |

### San Francisco

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 151 | 617,143 | 154 | 639,552 |
| September | 171 | 699,832 | 154 | 629,577 |
| August | 164 | 670,748 | 159 | 653,208 |
| July | 166 | 674,380 | 166 | 676,092 |
| June | 154 | 652,411 | 134 | 560,605 |
| May | 168 | 709,182 | 156 | 625,712 |
| April | 161 | 555,903 | 156 | 569,368 |
| March | 179 | 710,763 | 150 | 631,782 |
| February | 142 | 565,514 | 135 | 567,268 |
| January, 1930 | 158 | 644,015 | 149 | 630,336 |

### Houston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| October, 1930 | 34 | 136,215 | 50 | 182,729 |
| September | 32 | 140,415 | 62 | 220,024 |
| August | 39 | 147,462 | 69 | 257,365 |
| July | 30 | 120,727 | 42 | 158,570 |
| June | 47 | 190,145 | 45 | 193,620 |
| May | 41 | 146,840 | 47 | 172,171 |
| April | 38 | 139,147 | 57 | 206,182 |
| March | 33 | 130,108 | 43 | 162,519 |
| February | 37 | 149,161 | 60 | 226,761 |
| January, 1930 | 28 | 99,518 | 43 | 148,219 |

Note: The figures given in this article are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 71 of 245,660 net tons entered and 86 of 288,469 net tons cleared for the month of October.

# Latest Data on New Marine Work

## Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

ON MAY 1, the shipping board reported 22,608 men employed in ten shipbuilding and repairing plants of the country, and on Nov. 1 the number had increased to 23,238. Under congressional authorization the board is planning to advance $80,942,446 as loans on vessels now under construction, the total cost of which will be $121,492,528.

"The majority of the vessels are less than half completed, thus assuring employment at the yards for many months to come," a statement by the shipping board said. "There also are pending several ship construction contracts."

Most of the shipyard employes are working on vessels being constructed or rebuilt for foreign trade with the aid of money advanced from the shipping board's construction loan fund and will be operated over United States mail routes under contracts authorized by the Jones-White law.

## Lay Keel for U. S. Liner

The keel for the largest American passenger vessel ever to be built in this country will be laid in Camden, Saturday, Dec. 6 at 11:30 in the morning, according to an announcement made recently at the offices of the United States lines, 45 Broadway, New York. This is the first liner to be constructed for the United States lines' North-Atlantic passenger trade in the contemplated extensive construction program.

To mark this important step in the development of the American merchant marine, plans are being made to conduct an appropriate ceremony at the time the keel will be laid on Way O at the plant of the New York Shipbuilding Co., in Camden, where the naval plane carrier SARATOGA was constructed.

The contract for these two ships was signed by Paul W. Chapman, president of the United States lines, last May and the preliminary design work was immediately started at the plant. The keel for the second vessel will be laid in about three months on the adjoining ways and both ships will be delivered in 1932—the first one in July and the second in November of that year.

The new 30,000-ton ships will be of the latest marine design with two low rakish elliptical funnels, semi-bulbous bow, raked stem, merchant counter cruiser stern, giving the vessels the appearance of grace and speed. They will be 705 feet long with a beam of 86 feet and will carry first, tourist and third class passengers to a capacity of about 1300—600 first class, 470 tourist and 230 third class passengers. The management of the United States lines established an innovation by eliminating second class from the LEVIATHAN, the first of the super ships to discontinue this classification.

## To Christen Dollar Liner

The passenger and cargo liner PRESIDENT HOOVER, first of two new vessels ordered by the Dollar Steamship line for its transpacific service, is to be christened by Mrs. Hoover as it slides down the ways at the Newport News Shipbuilding & Dry Dock Co.'s yard on Tuesday, Dec. 9. The vessel is a twin screw turboelectric liner of 23,000 tons gross register, and a displacement of 31,000 tons. She is 653 feet long, 81 feet beam and 52 feet deep, with accommodations for 1260 passengers in all classes and a crew of 300 men. She will have a speed of 21 knots, which will make her the fastest in the San Francisco-Yokohama service.

## New Loan for Equipment

A loan amounting to $159,726, representing three fourths the cost of hotel equipment installed in the S. S. MORRO CASTLE, recently completed at the Newport News Shipbuilding and Drydock Co., for the Agwi Navigation Co., was granted the owners by the shipping board Oct. 29. The amount of $212,968.01 was expended by the Agwi company for this part of the ship's equipment in addition to its original construction cost of $4,350,000, three fourths of which amount has been loaned by the board under authority of the Merchant Marine Act of 1928. Repayment of the additional loan will be made in 20 annual instalments with interest at not less than 3 per cent per annum.

## New Italian Superliner to Be Equipped with Gyroscopes

The new Lloyd Sabaudo superliner CONTE DI SAVOIA, now building in Trieste, which is expected to enter the New York-Naples run in 1932, in addition to being one of the fastest ships afloat will have the distinction of being the first liner to be equipped with gyroscopes. A set of three gyroscopes weighing 100 tons each and costing $1,000,000 has been ordered from the Sperry Gyroscope Co., Brooklyn, N. Y., and will be built into the new vessel. The gyro wheels will be 30 feet in diameter, and the device will be powerful enough to hold the decks level in the roughest weather. Yachts and cruisers not exceeding 10,000 tons in size have used the stabilizers successfully for several years but the great expense of installing them on larger vessels has heretofore prevented use of the device by steamship companies.

The new CONTE DI SAVOIA will be of 45,000 gross tons with a speed of 27½ knots, a length of 820 feet and a beam of 96 feet. She will accommodate 500 first class passengers, 300 second class, 450 tourist and 1000 third class. The estimated cost of the vessel is $15,000,000.

## To Call for Bids on Ships

Word was received recently from San Francisco that the Oceanic & Oriental Steamship Co., jointly owned by the American Hawaiian and the Matson lines, will shortly call for bids for the construction of four new steamships to cost approximately $2,500,000 each.

The new vessels are to operate between California ports and North and South China. They are to have a speed of 16 knots and will be 10,000 tons deadweight. The O. & O. line was awarded a contract some time ago for the carriage of United States mails between California and China, the contract stipulating that four vessels for a certain size and speed must be ready for service by a specified time. It is understood plans and specifications for the new ships are nearing completion.

Pacific coast shipbuilding interests are hopeful of obtaining the contract for the new vessels. Thus far they have been unable to obtain one single shipbuilding order in the great program of new vessels which is being created as a result of the Jones-White act. East coast yards, which have obtained all of the work thus far, will bid for the latest contract for the proposed transpacific vessels. The Pacific coast builders also expect the eastern yards will bid on the new vessels which the McCormick Steamship Co. contemplates building within the near future.

## Newport News Yard Holds Sea Trials of Oriente

THE Ward liner ORIENTE, second vessel completed in the company's big $10,000,000 shipbuilding program for the New York-Havana express service, attained a speed of 21 knots during her official sea trials which were held Nov. 12. Off the Virginia Capes.

A radio message to this effect was received that afternoon by Franklin D. Mooney, president of the Atlantic Gulf and West Indies Steamship lines of which the Ward line is a subsidiary, from H. E. Cabaud, first vice president of the Ward line who was aboard the ORIENTE.

"ORIENTE attained speed of 21 knots. All on board delighted with the way vessel functioned. Predict that when she enters the Havana run she will prove worthy companion of MORRO CASTLE."

The ORIENTE returned to the yards of the Newport News Shipbuilding Co. late in the day and she will remain there until Dec. 11 when she will be brought around to New York and made ready for her maiden voyage to Havana on Dec. 17.

## Ship Cuts Day Off Voyage

Saving of a day in the intercoastal voyage was established recently with the arrival at Philadelphia of the Luckenbach liner, SUSAN V. LUCKENBACH, from Pacific Coast ports, fully loaded with foodstuffs and general cargo.

This vessel formerly the shipping board freighter NEPONSET of 4651 net tons, was equipped with a 1000-horsepower low pressure turbine following her purchase by the Luckenbachs.

This turbine geared to the main propelling shaft takes steam from the low pressure cylinder of the ship's main reciprocating engine power plant, adds ten revolutions to the shaft and more than a knot to the speed, according to Ira Head, chief engineer of the craft. Before the installation of the turbine, built at the South Philadelphia plant of the Westinghouse Electric and Manufacturing Co., the ship averaged 12.29 knots, but during her last round voyage, with the turbine, days' runs at an average of 14.2 knots were recorded.

The low-pressure turbine in connection with the reciprocating engine, is the first American installation of this type.

## Routine Work on Leviathan

The LEVIATHAN, flagship of the United States lines' fleet went into the Commonwealth drydock in Boston for her semiannual underwater inspection Nov. 25. This announcement was made recently at the offices of the United States lines, 45 Broadway, New York.

The present schedule calls for departure of the LEVIATHAN from New York about noon on Nov. 24, after discharging passengers following her arrival here. She will be in the drydock at 12:30 p.m. on Tuesday. The LEVIATHAN will depart from Boston on the morning tide Sunday, Nov. 30, arriving in New York Monday morning, Dec. 1, ready to sail for Cherbourg and Southampton the following Saturday.

The work on the LEVIATHAN is merely a routine job at this time of the year. The hull is scraped and repainted and the underwater section of the ship closely surveyed so as to preclude the possibility of any defect developing.

## Bids on Boston Fireboat

Four bids have been received for the construction of the new fireboat for the City of Boston, which will be the most powerful floating fire-fighting machine on the entire coast. The lowest bid came from the Hampton Roads Shipbuilding Co. of Portsmouth, Va., $294,997. While the bid was the lowest the time of construction was 14 months, which is much longer than that required by any of the other bidders, whose bids ranged from $342,500 to $395,000, with completion in eight to ten months.

## Hold Sea Trials of Single Screw Motor Tanker

THE single screw tank motor ship STEGG, built to the order of Skibsaktieselskapet "Cleantank" of Oslo (Messrs. Stephensen & Rorgersen) has recently been launched at the Tyne Iron shipyard, Willington quay, and has completed her official sea trials under fully loaded conditions and with highly satisfactory results.

The vessel is of the two deck type, with poop bridge, and forecastle, and as an overall length of 408 feet molded breadth of 54 feet 9 inches, and is designed to carry a deadweight of about 9000 tons 26 feet draft.

The main propelling machinery was constructed by the shipbuilders at their Scotswood works, and consists of a single screw installation with Armstrong-Sulzer diesel engine of the single acting two cycle air injection port scavenging type, having six cylinders capable of developing 2500 brake horsepower.

The engine is enclosed, fitted with crossheads, provided with forced lubrication.

The main air compressor and scavenging pump are driven from an extension of the crankshaft. Oil fuel, cooling water piston cooling, lubricating oil, bilge and sanitary pumps and separate lubricating pump for crosshead are all driven off the main engine.

One single-ended cylindrical boiler suitable for burning oil under natural draft has been provided for harbor duties, and a small Cochran vertical type boiler for supplying steam at sea.

The vessel and machinery were built under inspection of Lloyd's Register and to their highest class.

During the trials, the owner of the vessel, Mr. Stephensen was on board with his consulting engineer and the naval architect and are highly satisfied with the results obtained.

The Geo. Stratford Oakum Co., 168 Cornelison Ave., Jersey City, N. J., recently moved to 120 Montgomery street, Jersey City, N. J.



*Single screw motor tanker Stegg which recently ran successful sea trials*

## Lay Keel at Bath for First Diesel Electric Yacht

RECENTLY, the keel for the first yacht equipped with diesel electric drive was laid at the Bath Iron works in Bath, Me.

The yacht will be fitted with complete pilot house control so that the speed of each of the twin screw propellers can be controlled from the pilot house as well as from the engine room. This feature is of great aid in crowded harbors and when the yacht is approaching an anchorage. The yacht was designed by Henry J. Gielow, Inc., New York City.

The 190-foot yacht GIELOW, third of five yachts of similar design which have been under construction since the summer of 1929, was launched at the Bath Iron Works Corp. plant, Oct. 1, and was delivered to her owner, Joseph A. McDonald of New York, three days later. At the time of launching all of her furniture, carpets and draperies were on board, a very unusual state of completion for a new yacht.

On the eighteenth of October, another 190-foot yacht was launched, the TRUDIONE, now the property of Ross W. Judson of Detroit. This latter vessel has since undergone her dock trials and is awaiting word from her owner regarding delivery.

Work on the yacht for Mr. Sorensen and on a yacht for Mr. Goodyear is progressing rapidly, also on a large yacht for Mr. Johnson. The large steel yacht for Mr. Hugh J. Chisholm is nearing completion and will be launched early in December.

During this month a contract was signed for a new yacht 146 feet long.

## New Ferryboat Ordered

Contract for construction of another ferryboat of the TOMPKINSVILLE and DONGAN HILLS type, the largest in New York harbor, has been awarded to United Dry Docks, Inc., by Albert Goldman, commissioner of plant and structures. The contract was awarded on United's bid of $941,000, the lowest figure submitted.

The new boat, which will operate between St. George, S. I., and the Battery, will be built at the Mariners Harbor, S. I. plant of United Dry Docks, which also constructed the recently launched TOMPKINSVILLE and its sister ship, the DONGAN HILLS. Construction will start at once, giving employment to several hundred men. The same plant now is building a large cutter for the United States coast guard.

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Two twin motor anchor windlasses of 180 horsepower each, the largest ever built in the United States have been ordered by the New York Shipbuilding Co. from Allen Cunningham, Seattle, for installation on the two 32,000-ton liners to be built for the United States lines at the company's yard at Camden, N. J.

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A dry dock for the O'Brien Bros. Shipyard Corp. of New York was launched on Nov. 19 from the Wilmington plant of the American Car & Foundry Co. The dry dock is 216 feet long and 75 feet wide and will have an approximate capacity of 2000 tons. It will be towed to the O'Brien shipyard at Rosebank, S. I.

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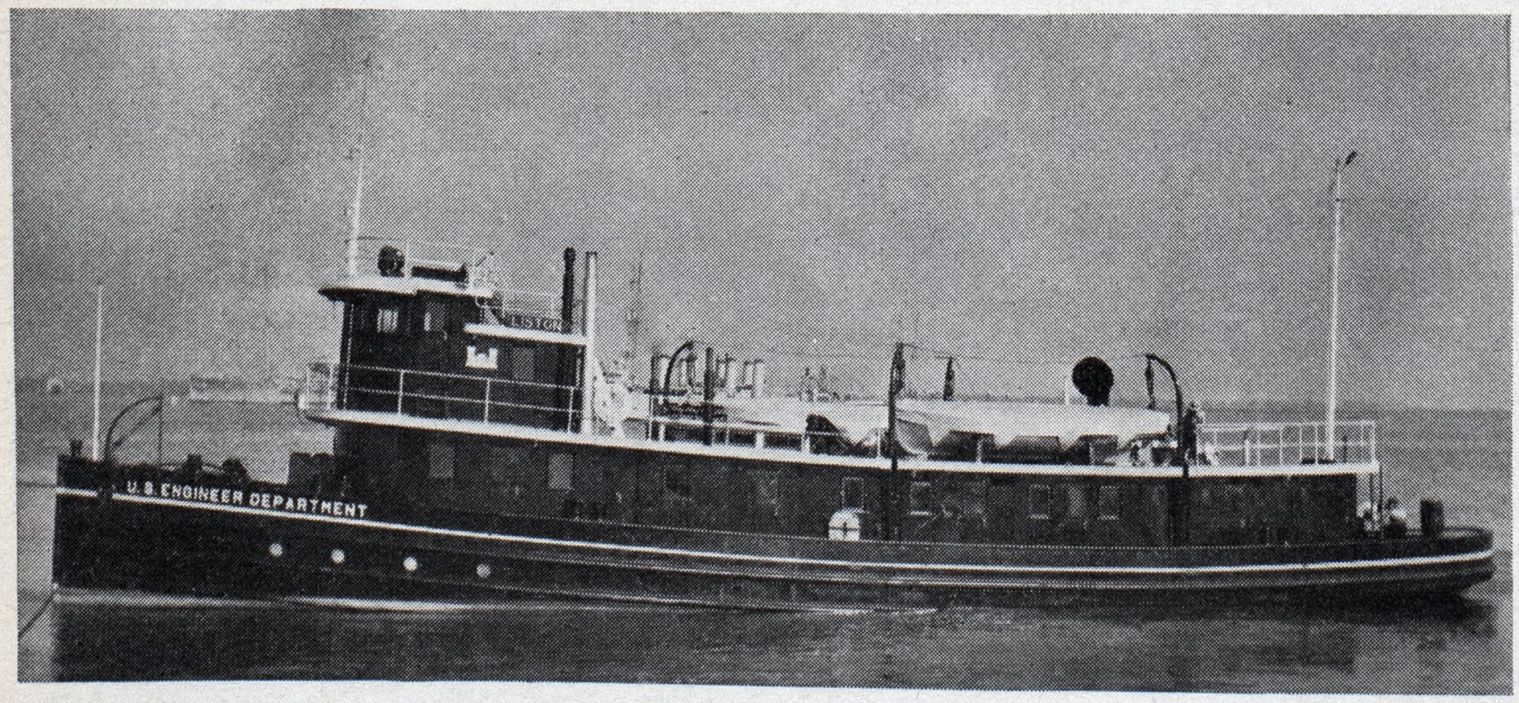
## Launch Edsel Ford Yacht

The ONIKA, the 125-foot yacht built for Edsel Ford, was launched recently from the yard of the Pusey & Jones Corp. The vessel, powered with two 275-horsepower diesel engines, will be used in Florida waters this winter by Mr. Ford.

Edsel Ford was unable to attend the launching.

The yacht was designed by Henry J. Gielow of New York. It of the twin screw, offshore type, and will have a speed of 14 knots. There are four large staterooms and a large living room.




*Diesel Electric Steel Survey Boat Liston, built by Charleston Dry Dock & Machine Co. for United States Engineers for Survey Work on Delaware River. Two 225 H.P. Lombard Engines Connected to General Electric Generators. Supply Current to one Propulsion Motor. A More Complete Description of this Vessel Appeared in November* MARINE REVIEW

## Cunard Superliner Will Be 73,000-ton Ship

IN AN address on the Cunard insurance bill before the house of commons, London, on Nov. 21, W. R. Smith, parliamentary secretary of the board of trade, revealed specifications for a 73,000-ton liner which will challenge the Germans for supremacy in the North Atlantic traffic. The vessel, he said, would be 1018 feet in length, 115 feet beam, and would cost approximately $22,500,000, the government insuring half.

John Brown & Co., Clydebank, Scotland, builders of many large liners including the AQUITANIA, LUSITANIA and the new EMPRESS OF JAPAN, have been assured of the contract and its engineers have been working for months on preliminary plans for the new ship. Dredging has been started in the Clyde to provide ample water to float the huge vessel when she is launched late in 1932. Plans call for a speed of 30 knots or better and her engines will develop 200,000 horsepower. Luxurious accommodations are planned for 4000 passengers and her crew will number 700.

The Cunard line already has discussed with the government the underwriting of a portion of the insurance for a sistership of the superliner, work on which will begin some time during 1931. It is reported that this second ship may be built at the yard of Swan, Hunter & Wigham Richardson Ltd. of Wallsend-on-Tyne, builders of the MAURETANIA.

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## Trials of Converted Ship

The newly converted self-trimming and self-discharging bulk cargo carrier H. F. DEBARDELEBEN, formerly the shipping board freighter BREMERTON, passed her trials successfully recently at New Orleans. The vessel which is owned by the Bulk Transportation Co., a subsidiary of the DeBardeleben Coal Corp., was remodeled during the summer at the Jahncke Dry Docks company plant at a total cost of $700,000. The conversion was effected under plans prepared by Edwin C. Bennett, New York naval architect and marine engineer. The equipment of the vessel includes a triple expansion steam engine and three single-ended Scotch boilers arranged for burning pulverized coal. This machinery is located aft. In each of the five cargo holds there are two scraper tunnels together with diagonal bilge tanks so that the contents of bulk commodities will automatically run into the scraper tunnels. The patented self-discharging equipment will carry the cargo from a scraper tunnel to an endless belt running on a 140-foot boom standing on the trunk deck which will discharge ashore at the rate of approximately 1000 tons an hour up to 113½ feet from ship-

# Up and Down the Great Lakes

## Amalgamation of Shipping Interests on Lake Michigan—Coal and Ore Shipments Off—October Lake Levels—Self Unloading Barge—Lake Carriers School

REPORTS of an amalgamation of all the shipping interests of the East and West shores of Lake Michigan are noted in connection with developments in Lake Michigan transportation line affairs. It is understood headquarters of the combined interests will be at Chicago.

The Goodrich Transit Co., one of the oldest passenger and freight lines on Lake Michigan, with a fleet of 11 steamers, has just been taken over by receivers appointed by Federal Judge James H. Wilkerson, of Chicago. The receivership was through the request of the Consumers Co., of Chicago, which presented claims totaling $39,000, no other liabilities being listed. Capt. Edward E. Taylor, president of the Goodrich company, and George F. Getz, Chicago capitalist, have been appointed receivers.

Attorneys for the Consumers company asserted in their petition that because of frozen assets, the Goodrich company will be unable to meet a $100,000 mortgage that falls due Jan. 1 next. Assets of the Goodrich Transit Co. exceed $2,000,000.

## Capt. Cartwright Dies

Capt. P. M. Cartwright, grand president of the International Shipmasters association and captain of the steamer COL. JAMES PICKANDS of the Pickands, Mather Co. fleet died Thursday, Nov. 13.

Capt. Cartwright was born Sept. 12, 1871 at Algonac, Mich. In 1902 he began work with Pickands, Mather & Co. on the steamer APPOTOMATOX and had been master of various other vessels of the company's fleet during his 28 years of service since that time. In 1926 he was made master of the steamer COL. JAMES PICKANDS.

Capt. Cartwright was active in the affairs of the International Shipmasters association for many years. In 1928 he was elected first grand president of the grand lodge of the association and in 1929 was re-elected to the same office. The following year he was further honored by being elected grand president for the third time.

## Coal and Ore Shipments Off

Receipts of iron ore and shipments of bituminous coal at Lake Erie ports during October were below what they were for the same month last year. According to the report issued Nov. 7 by the Lake Superior Iron Ore association and the Ore and Coal exchange, a total of 4,011,476 tons of ore were received during the month as compared with 6,052,038 for the same time last year. The tonnage of coal dumped during October was 4,574,812 tons as compared with 4,930,913 tons for the same month a year ago.

## October Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of October as follows:

| Lakes | Feet above mean sea level |
|---|---|
| Superior | 602.77 |
| Michigan-Huron | 580.36 |
| St. Clair | 575.19 |
| Erie | 572.29 |
| Ontario | 246.24 |

Lake Superior was 0.04-foot lower than in September and it was 0.08 foot lower than the October stage of a year ago.

Lakes Michigan-Huron were 0.31-foot lower than in September and they were 1.12 feet lower than the October stage of a year ago.

Lake Erie was 0.33 foot lower than in September and it was 0.65 foot lower than the October stage of a year ago.

Lake Ontario was 0.61 foot lower than in September and it was 0.72 foot lower than the October stage of a year ago, 0.93 foot above the average stage of October of the last ten years.

## Self Unloading Barge

Universal Atlas Cement Co., subsidiary of the United States Steel Corp., recently launched the JANE AFFLECK, a self-unloading barge, 226 feet long, with a 40-foot beam and a clearance of 12 feet 6 inches, at the plant of the Illinois Steel Warehouse Co., in the Chicago district. The barge, which was built by the Universal Atlas company, is to be used for transporting bulk cement from the Buffington, Ind., plant of that company to Milwaukee and other Great Lakes ports, and has a capacity of 2000 tons, or 10,000 barrels of cement.

The electrically driven self-unloading features include a tunnel scraper system designed by Leathem D. Smith, Sturgeon Bay, Wis., which consists of a single longitudinal tunnel the length of the cargo hold, enabling the cement to feed into the tunnel just above the tank top. In this tunnel is operated a crescent shaped scraper, open top and bottom, which drags the material up an incline to the hopper. The hopper feeds directly into a 10-inch cement pump working with compressed air, which conveys the cement through an 8-inch pipe to the dock storage silos. At the apex of the tunnel a trolley operates on a beam through which the backhaul cables are reeved. These in turn raise the rear end of the scraper and cause it to be returned through the tunnel over the top of the material.

## Protest Two-Watch System

Protest against what it styles the "medieval two-watch system" is made by the Sailors' union of the Great Lakes in a letter to federal officials at Washington. "Under this system," states the protest, "sailors are required to work 12 hours a day. This survival is a disgrace to American industry. At little or no additional cost the three-watch system, which has been in effect for a number of years on vessels on the Atlantic and Pacific coasts, could be inaugurated."

Maximum earnings of the average skilled seaman, declares the letter, are about $700 a year.

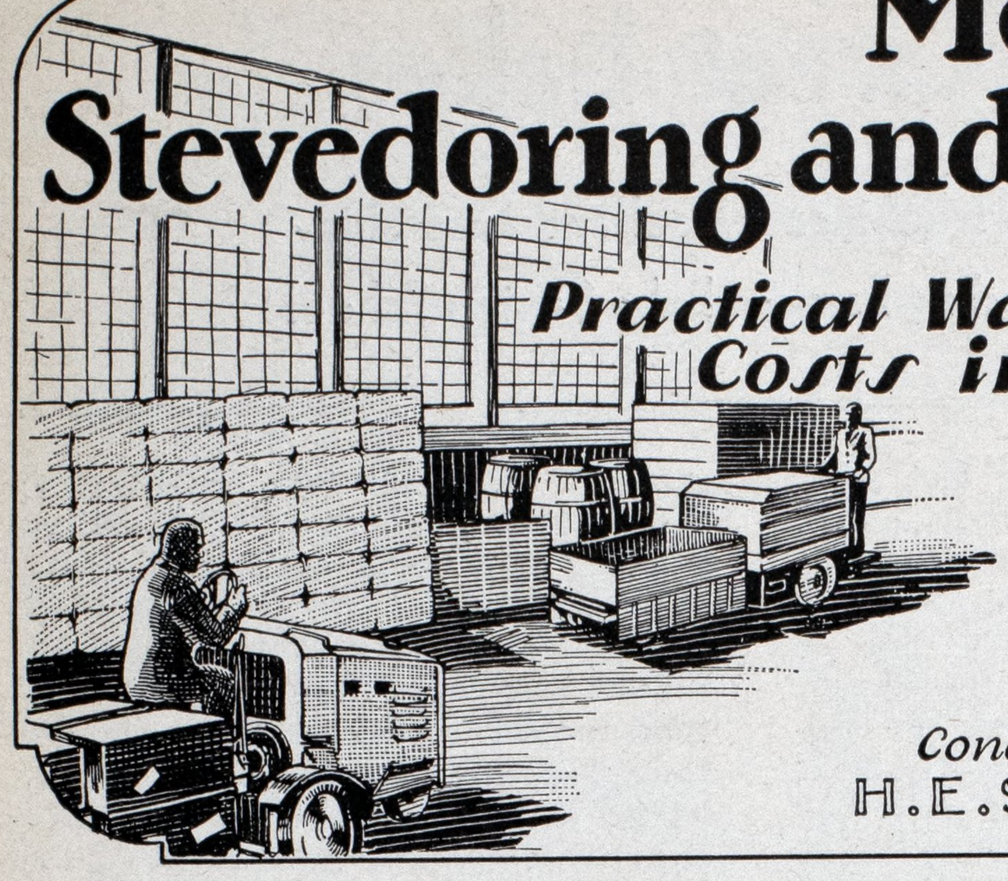
R. Floyd Clinch, aged 65 years, president of the Michigan Transit Corp., a Lake Michigan transportation line, and also head of the Crear-Clinch Coal Co., Chicago, died Nov. 7 of heart disease in that city.

## Lake Carriers Schools

Two schools, one at Cleveland and the other at Marine City, Mich., are to be conducted this season by the Lake Carriers' association for sailors on the Great Lakes. Wheelsmen and oilers are urged to take advantage of the schools of navigation and marine engineering which have been operated for the past 15 years by the association. These schools are to open Jan. 5. Application forms for enrollment have been sent to all ships operating on the lakes.

# Modern Stevedoring and Dock Management

## *Practical Ways to Cut Costs in Cargo Handling*



*Conducted by*
H. E. STOCKER

# Vessel Design with Special Reference to Cargo Handling and Stowage

SINCE economical cargo handling is the paramount consideration in operating a cargo carrying vessel, it should be the first thing (as well as the principal thing) to investigate and analyze, in all its various and related elements, when the ship design or pier design is being considered. In almost any industrial plant or operation, materials handling is given first consideration; and when a new factory or plant is projected, the modern practice is to make a thorough analysis and study of the product itself and the prospective volume of work; then make a study of the movement and "flow" of materials through the plant, then decide upon the facilities and equipment for handling the materials most economically with a minimum of rehandling, and then finally design the buildings and the rest of the plant "around the materials handling" layout or arrangement.

This same idea should be applied to the design of a new ship or pier intended for cargo handling or transportation of cargo. If an old pier is to be rebuilt or remodeled or improved (and the same thought applies to an old ship), the same principles and sequence of the engineering designs should be followed. The most important thing from an "operating cost" standpoint should naturally be the governing factor. In designing for the most economical cargo handling, therefore, the relationships between (*a*) the trade and cargo, (*b*), the terminal layout, facilities and methods, and (*c*) the ship itself, as a cargo handling and transportation unit, should all be simultaneously considered and co-ordinated. Since several interests and ownerships are usually involved, the novel idea is advanced that some kind of "co-ordinating body" of men representing the several interests and points of view could bring about better designing and operation of the cargo handling features in many cases.

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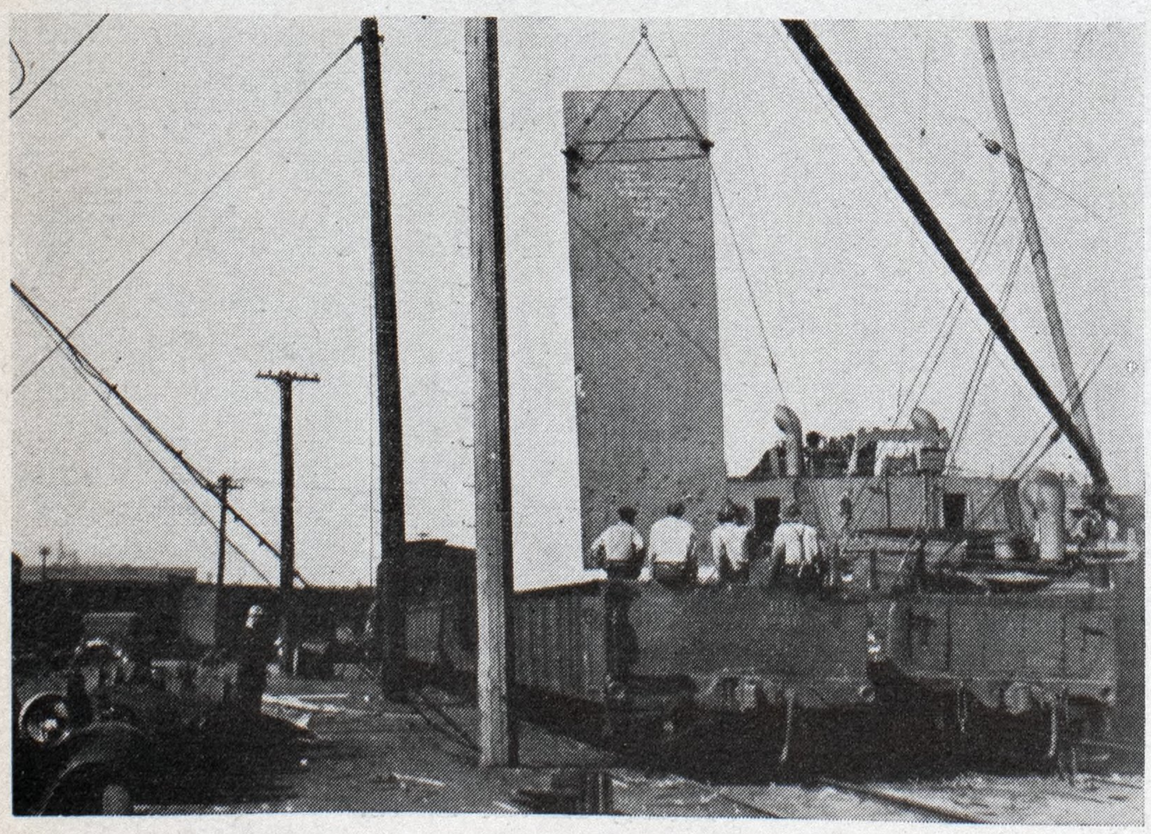
Abstract of paper No. 3 on *Ship Design From the Operator's Point of View,* by W. B. Ferguson, Carl E. Petersen and H. E. Stocker, read at the thirty-eighth general meeting of the Society of Naval Architects and Marine Engineers, held in New York, Nov. 13 and 14, 1930.



*In designing a Cargo Ship Length of booms should be considered. Long booms handling steel from car on second track.*

### Design for Trade and Service

Too much emphasis cannot be laid upon the necessity of designing vessels for the particular trade and conditions of the service in which they are to be operated. The shipowner, instead of having the naval architect prepare designs for a proposed new vessel of design characteristics similar to the best vessel now in operation in the trade, should place before the naval architect the transportation problem to be solved. There should be made available to the naval architect the owner's records, both operating and economic, and the naval architect should supplement these with economic studies of the trends of the trade. In order to properly solve the transportation problem of the owner the naval architect should make one or more voyages on the owner's vessels,

study their operation and the conditions peculiar to the trade; in short he should study the functions of the ship at sea and in the various ports. Only in this way can the real live facts essential to obtaining the best answer to the transportation problem be obtained.

Of the various cargo handling features and gear of the general cargo ship, the winch, whether steam or electric, has perhaps been the subject of more investigation than anything else. Consequently considerable progress has been made in winch design, and it appears that winches of normal capacity and speed are now available, having speeds somewhat in advance of the stevedores' ability to utilize fully.

The Panama-Pacific liners, CALIFORNIA, VIRGINIA and PENNSYLVANIA, have electric winches generally of capacity 3000 pounds at 235 feet per minute; the Grace liner, SANTA CLARA, has electric winches generally of capacity 3000 pounds at 280 feet per minute; while the two Dollar liners now building will have electric winches of rated capacity of 3000 pounds at 340 feet per minute. To utilize fully the cargo handling ability which the winches of the higher speed afford may require better facilities and methods of stevedoring than those now generally in practice.

### Steam or Electric Winches

Whether steam or electric winches be fitted to any particular vessel depends upon the kind of main propulsion machinery and engine room and deck auxiliaries adopted and the general service of the vessel rather than upon cargo handling ability.

The location and arrangement of winches is of prime importance. The winch operator should wherever practicable have a clear view down the hatch. Where deck cargoes are to be carried or where electric winches are fittted a raised winch platform is essential. For vessels operating in the Pacific trade winches should be arranged so that it is convenient for one winch operator to handle both winches.

The trend toward the adoption of side ports has brought to the fore the desirability of developing satisfactory ship elevators, particularly where the "blind hatch" condition exists. Considerable thought and effort are being given to this phase of the cargo handling problem, but much remains to be done before a thoroughly satisfactory and economical elevator for inside use will be developed.

For use in handling cargo through ship side ports, the Barlow elevator is admirably suited for dock use, and where there is considerable rise and fall of tide this or a similar elevator is essential.

The design of hatches is particularly important from the viewpoint of cargo handling. Economical handling of cargo is increased by large hatches, because the cargo is handled a shorter distance from the wings or sides of the holds to the hatch. Direct handling is the most economical handling; it is "straight line production" applied to cargo handling.

Hatches should be as large as the strength of the ship's structure permits. The Calmar freighter CUBORE, originally an ore carrier, now in general cargo trade, has hatches generally 37 feet wide by 33 feet and 39 feet long; these large hatches not only reduce costs of handling general cargo but also are essential in handling long steel and timbers.

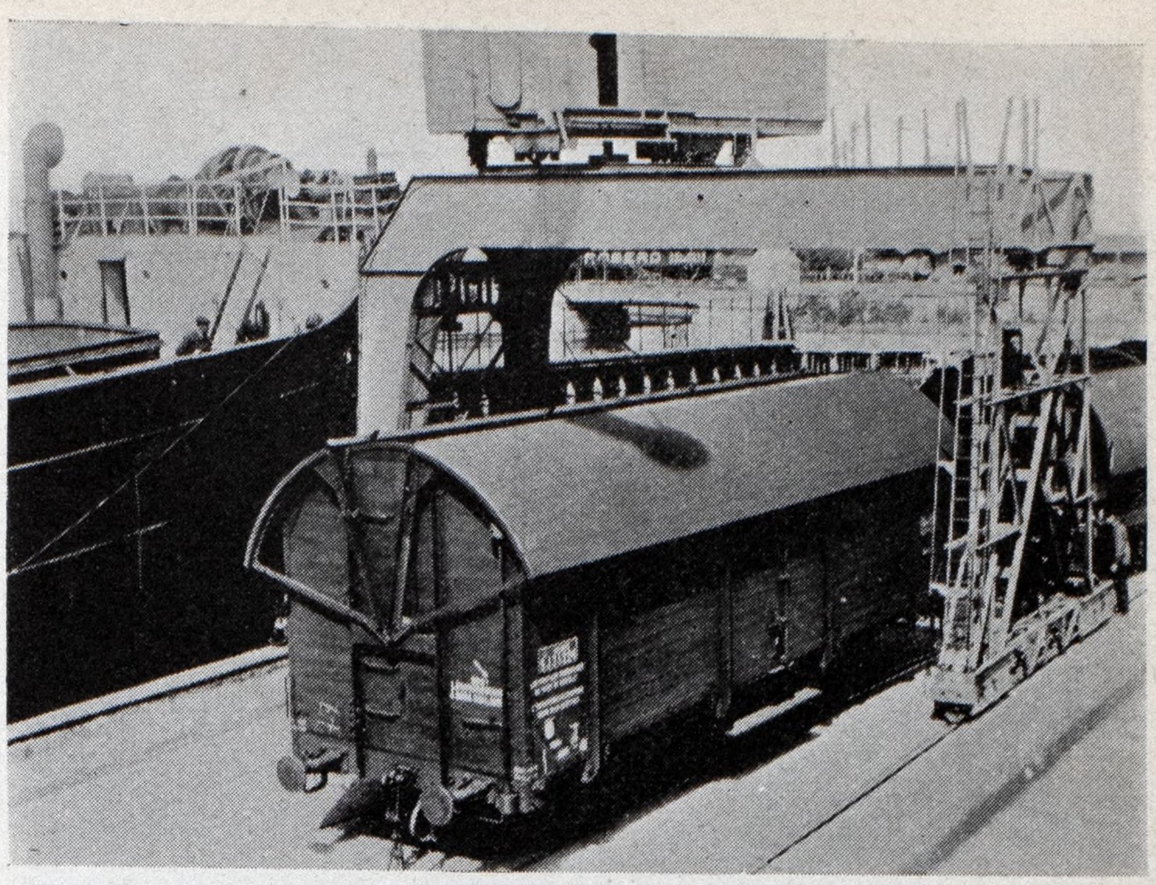
Large hatches facilitate doubling of gangs, a method of increasing ships' dispatch, discussed elsewhere in this paper.

A recent issue of *Shipbuilding and Shipping Record* contained an article suggesting that ships be designed with hatches on each side of the holds, with a fore and aft centerline bulkhead running the full length of the ship. The advantages claimed are the shorter distance from hold and 'tween deck to the hatch and the ability to work both sides of a ship at the same time as well as a better distribution of structural material contributing to the strength of the vessel. Doubling gangs in large hatches and provision of side ports is considered a better way to facilitate rapid and economical handling of cargo than this suggestion.

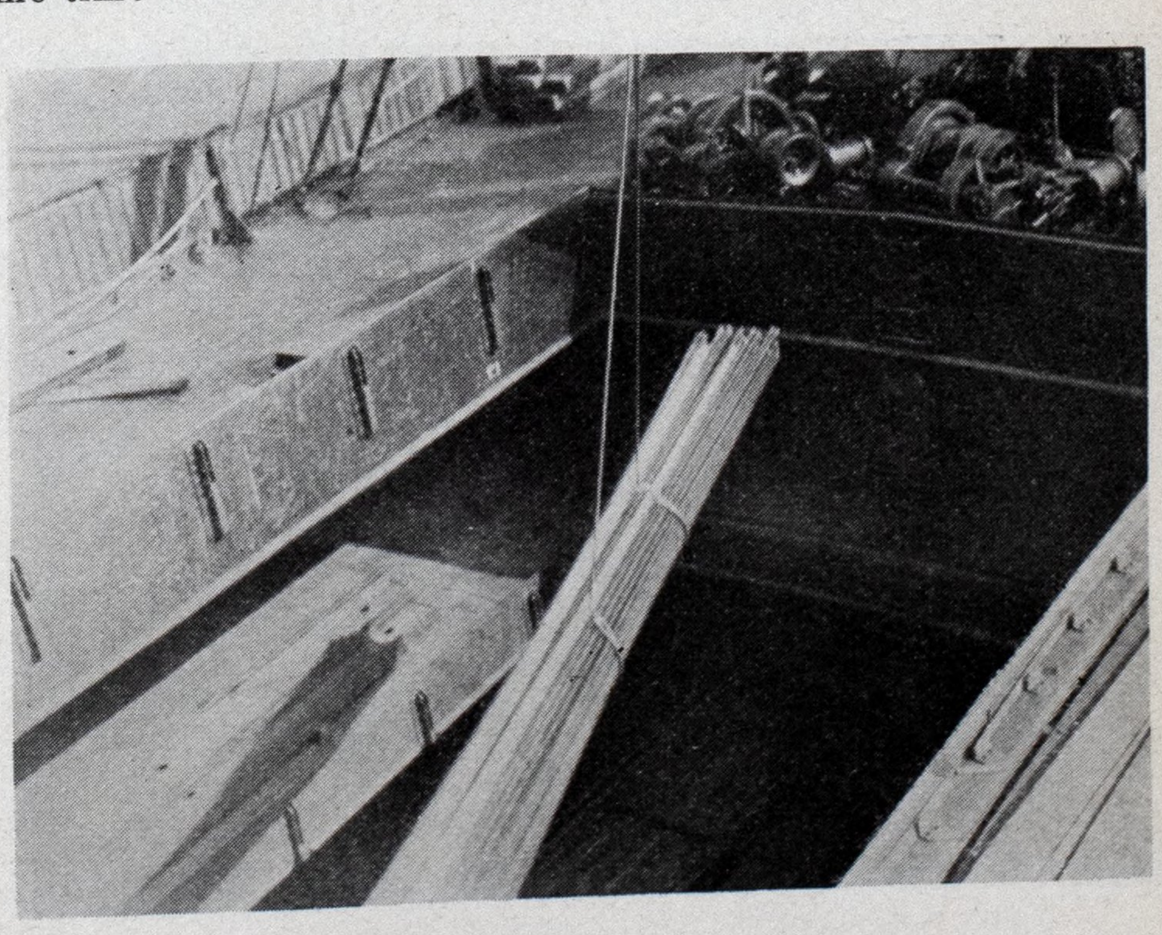
The larger the hatch, the greater the need for a better design of hatch covers and strongbacks. Many modern ships are fitted with wooden hatch covers and strongbacks but slightly improved in design over the hatch covers and strongbacks on ships built a quarter of a century ago. It is here that two important principles of materials handling engineering apply; to wit: "economy in moving materials is secured by not handling it," and "high handling costs are indicated where unnecessary handling is performed."* The time and money used in the unproductive labor of covering and uncovering ships' hatches with numerous wooden hatch covers and heavy steel strongbacks constitutes too large a percentage of cargo handling costs.

Hatch covers and strongbacks are moved every morning and every night, and from time to time during

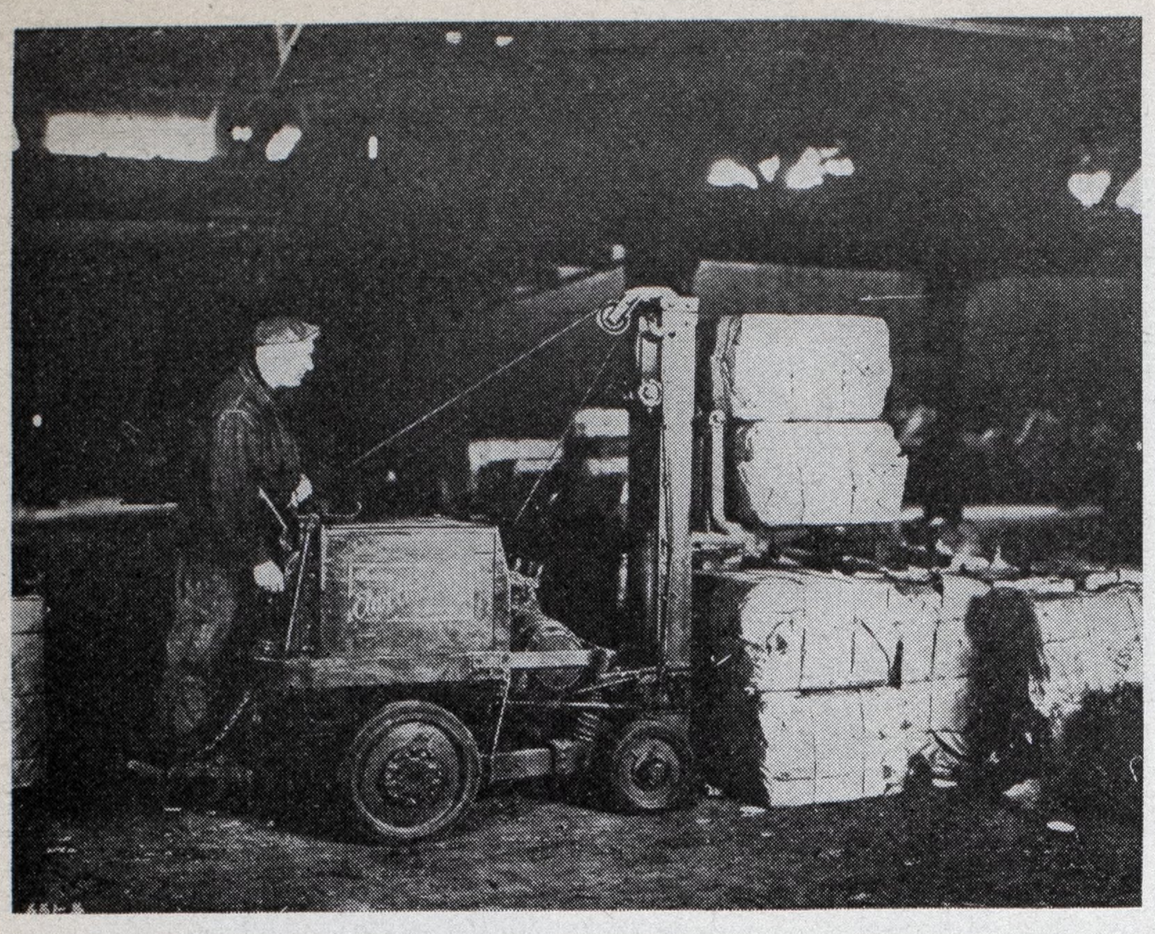
*H. V. Coes in "Management's Handbook," p. 742.



*Type of box car with portable roof used in Sweden—A similar arrangement has been suggested for use in this country for handling Lumber in unit packages.*



*Size of hatches should be deliberately determined for best results—Large hatches facilitate handling this Class of Cargo both in loading and discharging.*



*Mechanical dock equipment can be applied in a practical manner to reduce Cargo handlings costs—A storage battery Chisel Truck handling bales of pulpwood.*

the day as the gangs shift from hold to 'tween deck and back again, and possibly to shelter deck. Inclement weather causes still more laborious handling of hatch covers, tarpaulins and strongbacks.

For all vessels engaged in one particular trade, over $1,500,000 a year is spent on this unproductive labor. Investigation indicates that, by the use of steel hatch covers of one design or another, this unproductive expenditure could be reduced 50 per cent, resulting in a saving of $750,000 a year. At this time, with the flow of cargo seriously reduced and the rates subnormal, the transforming of $750,000 from the cost column to the profit column should be most welcome.

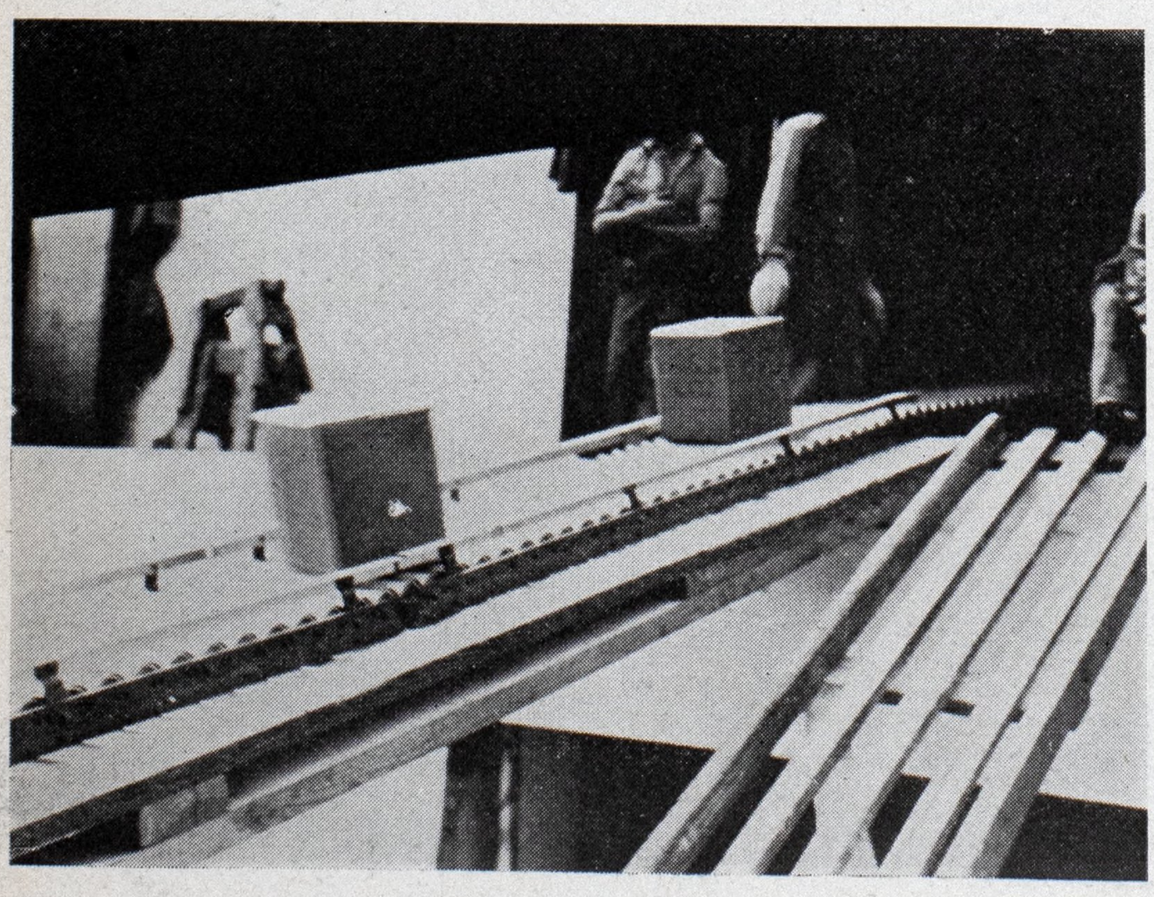
Steel hatch covers are used on some coastwise ships and on some ships operating in the foreign trade, and their use is becoming more general. These steel covers are generally of the hinged type. In large hatches the covers are divided into two sections. This type of steel hatch cover costs between 30 and 40 per cent more than wooden hatch covers and steel strongbacks.

TABLE 1

**Number of Voyages Per Annum**

| Port speed or No. days in port per voyage | Sea speed | | | | |
|---|---|---|---|---|---|
| Days at sea ..... | 60 | 50 | 42.9 | 37.5 | 33.3 |
| Knots ..... | 10 K | 12 K | 14 K | 16 K | 18 K |
| 14 | 4.95 | 5.54 | 6.40 | 7.08 | 7.75 |
| 21 | 4.50 | 5.14 | 5.71 | 6.24 | 6.76 |
| 28 | 4.13 | 4.67 | 5.16 | 5.57 | 5.97 |
| 35 | 3.85 | 4.29 | 4.68 | 5.03 | 5.38 |
| 42 | 3.56 | 3.94 | 4.29 | 4.60 | 4.85 |
| 49 | 3.37 | 3.69 | 3.96 | 4.22 | 4.42 |
| 56 | 3.13 | 3.44 | 3.69 | 3.90 | 4.10 |
| 63 | 2.95 | 3.23 | 3.40 | 3.62 | 3.80 |
| 70 | 2.81 | 3.04 | 3.20 | 3.38 | 3.59 |

An improved form of patent steel hatch cover for cargo ships is that known as the "Macanking" hatch cover. This cover consists of steel plates stiffened so as to be of the same strength as the deck itself and carried on a channel frame in the case of cargo ships and a bulb angle in the case of tankers, the lower edge of this frame bedding on a soft packing carried on the stiffening bar at the top of the hatch coaming, additional pressure being obtained by means of wedge-shaped cleats arranged all around the cover, thus yielding a perfectly watertight joint and binding the cover definitely to the coamings. When it is desired to open the hatch, the weight of each cover is transferred to four steel rollers carried on eccentric bushes, the turning of the bush by means of a toggle being sufficient to raise the cover from the coaming, when one man or two boys can easily roll the cover to the side of the ship, leaving the hold open for the working of the cargo.



*Use Power Wherever Possible for Moving Cargo—Roller Conveyor Used to Transfer Cases of Butter From Refrigerator House on Deck to Dock.*

The advantages of properly designed steel hatch covers follow:

1. Handling of numerous hatch covers as well as strongbacks and tarpaulins is eliminated.
2. Fireproof.
3. Safer for longshoremen, ship's and other personnel. (Decks are not cluttered with hatch covers and strongbacks; no danger from loose covers.)
4. Less maintenance expense. (A foreign shipping periodical reports actual annual costs of repairs and renewals of wooden hatch covers, coamings, fittings and tarpaulins for a 6000-ton deadweight cargo liner at $3100.)
5. Safe platform is provided for working cargo.
6. Greater seaworthiness: cannot be easily stove in by heavy seas; greater value in retention of buoyancy when hold fills with water because air is retained.
7. Simple operation facilitates ventilation of holds at sea.
8. Quickly closed in inclement weather.
9. Cargo space is increased because steel hatch covers are not so deep as strongbacks.
10. Less damage to cargo by hitting slides provided for strongbacks.

On ships carrying passengers, particularly those of the coastwise type having superstructures of wood construction generally, steel hatch covers are justified from the standpoint of fire protection.

Provision of side ports is a further step in designing ships for economical handling of cargo. Side ports are not always economical. A thorough analysis must be made in each case to determine the use to which the side port will be put in the particular service in which the ship is to operate and to determine the

economies in cost and ship's time resulting.

The use of sideports is the most complete application of the straight line production principle to cargo handling. Instead of hoisting cargo, as in the case of hatches, from the dock up 30 feet, then over 30 feet to hatch opening, and down 15 feet to the 'tween deck, then moving it back toward the starting point 25 feet, the cargo moves in a direct line from pier to place of stowage, a distance of possibly 15 feet. The saving in distance traveled would be 85 per cent. The average saving would be less than 85 per cent, but would be at least over 50 per cent.

An Eastern Steamship lines steamer recently loaded 1100 tons of general cargo into a side port ship in six hours; 183 tons an hour. If loading through hatches had been worked, this rapid loading would not have been attained. A ship on the Great Lakes discharged 2200 tons of flour and other mill stuffs in seven hours.

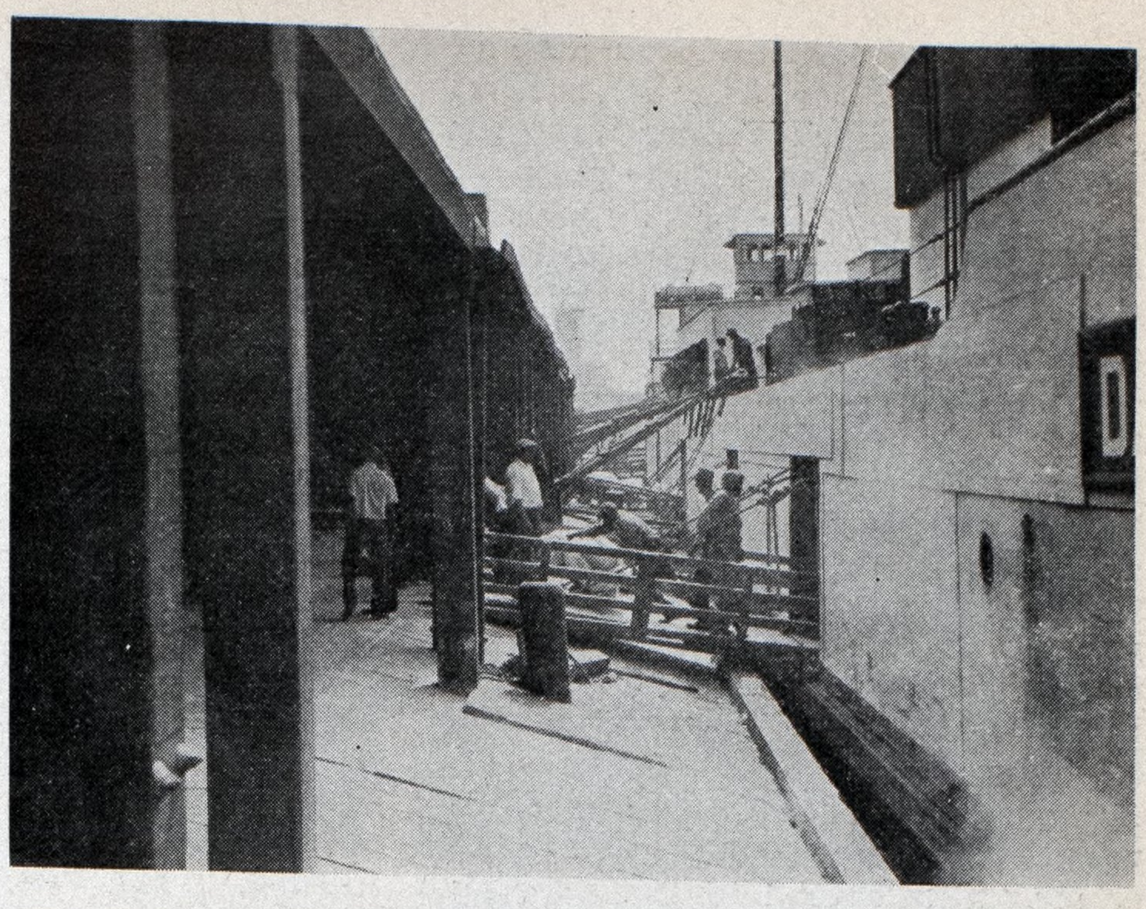
Handling through side ports lowers the cost per ton more than is possible when handling cargo through hatches. One authority states that, by handling cargo through side ports, 30 per cent can be saved and that *claims* will be reduced 30 per cent and points out that an important economy is the reduction in *overtime*. Any change in methods or equipment that reduces overtime has over one-third greater effect than a change that reduces *straight* time costs.

At one coastwise terminal 2.23 tons per man hour is obtained in handling cargo; at another terminal 1.72 tons per man hour is obtained. This could not be done if these ships were handling cargo through hatches alone even if the size of the hatches and character of cargo conditions of stowage permitted doubling the gangs. A deep sea freighter handled 5000 tons in ninteen hours by working 11 gangs in 5 hatches, but averaged less than 1 1/3 tons per man hour.

Faster and more economical work is possible in side port ships in inclement weather because canvas tunnels are provided so that the flow of cargo is uninterrupted. Overall hatches must be covered in severe, inclement weather.

It was stated previously that one of the advantages of side ports is that they tend to equalize the handling of cargo stowed in holds in unequal quantities. When this is not the result of poor supervision, it is due to the design of ships with holds of great difference in capacity. In so far as practicable, ships should be designed with holds of equal capacity.

If a ship with five hatches were provided with side ports serving the larger holds, the number of men



***Practical Experience Has Demonstrated the Great Value of Side Ports in Economical Handling of Cargo —This Great Lakes Freighter Has Six Side Ports to Each Side.***

TABLE 2

**Per Annum Expenses and Revenues**

10,000-ton deadweight cargo vessels, single screw, 26′ draft

*Voyages per annum*

(A) 12-knot ship, first cost $1,500,000 ..... 4.03
(B) 16-knot ship, first cost 1,920,000 ..... 4.70

Basis used: 40 days in port per voyage.

| | | Ship "A" Dollars per annum | % | Ship "B" Dollars per annum | % |
|---|---|---|---|---|---|
| Fixed Charges: (10% of ship cost) | Expense item<br>Depreciation at 3%<br>Insurance at 4¾<br>Taxes at 4¾<br>3% interest on ¾ of ship cost (2¼) | $150,000 | 26 | $192,000 | 27 |
| Semi-Fixed Expenses: per annum | Pier rentals | 25,000 | | 25,000 | |
| | Wages (crew and officers) | 50,000 | | 52,000 | |
| | Food and stores | 25,000 | 32 | 26,000 | 29 |
| | Administration and overhead expense | 40,000 | | 42,000 | |
| | Maintenance and repairs | 45,000 | | 58,000 | |
| Variable Expenses: (*a*) (*b*) Varies with number of voyages (*b*) | Fuel (approximate, see Table 3 below) | 40,000 | | 80,000 | |
| | Cargo handling | 130,000 | | 150,000 | |
| | Cargo insurance | 10,000 | 42 | 15,000 | 44 |
| | Port dues—Canal tolls | 40,000 | | 47,000 | |
| | Pilotage and towage—Commissions and brokerage | 25,000 | | 30,000 | |
| | Total Expenses | $580,000 | 100 | $717,000 | 100 |
| Based on number of voyages at $160,000 per voyage | Total Revenues | 644,800 | | 752,000 | |
| | Net Profit | $64,800 | | $35,000 | |
| (*a*) Per cent return on owner's investment | | 12.92% | | 5.83% | |
| (*b*) Per cent return on cost of ship (including *all* interest on money invested) | | 6.57% | | 4.07% | |
| Approximate investment by Owner: ¼ cost of vessel plus working capital (Add 1/3 more to owner's investment for working capital) | | $500,000 | | $600,000 | |

***Mechanical Equipment Can Also Be Used to Advantage Within the Ship Itself If Designed to Permit Its Use— Tractor Trailer Train Handling Cargo In Tween Decks of Coastwise Vessel.***

could be increased and the time of discharging of the different hatches could be brought nearer together and the overtime materially reduced.

In designing side ports consideration must be given to the fact that there is an increasing use of mechanical equipment such as tractors, trailers and lift trucks. The ports should be wide enough to permit two tractors to pass and high enough not to unduly restrict the loading of trailers and skids with bulky cargo. The coamings should be kept very low, preferably eliminated; this is in line with the fundamentals of materials handling engineering that all effort used in surmounting such obstacles be reduced to the minimum. The wasted effort getting over the "hill" caused by the coaming amounts to an appreciable amount in the life of a ship. In ships already built long toe plates should be provided to lessen power necessary to go over the coaming and to shorten trucking distances.

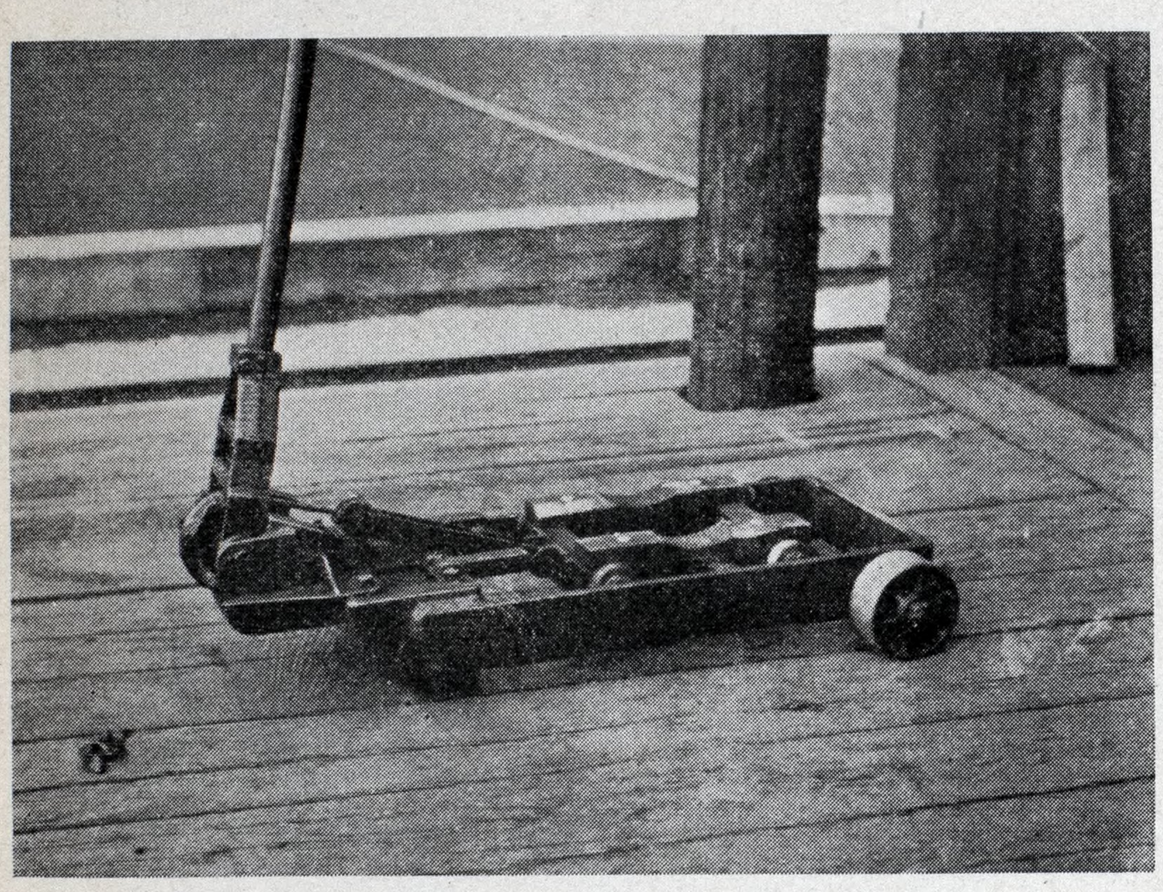
The side port doors should be designed so that they could be opened and closed quickly. Doors should open out rather than in, in order to conserve cargo space and provide greater ship safety.

In side port ships, if deck plates are flush, less power (hand or mechanical) is wasted and the wear and tear on trucks is reduced. It is estimated that it would cost about $1000 additional to provide flush decks in the 'tween decks of a typical coastwise freight or passenger steamer by jogging plating (seams and butts) and by providing joggled deck beams in way of deck plating. "While these factors enter into cargo handling in side-port ships to a greater extent than in overall ships, it is also worthy of consideration in overall ships, particularly in those cargo compartments where cargo must be trucked to be handled economically.

Stanchions and ventilation trunks are a serious handicap in handling cargo, especially in side-port ships where tractors and trailers and other mechanical equipment is used. Stanchions at least should be kept to a minimum and located clear of hatch openings. It would often be more economical during the life of a ship to spend more money on first cost of decks and reduce the number of stanchions because of the savings in cargo handling costs during the ship's life.

Elevators in side-port ships should be designed so that mechanical cargo handling equipment could be used with maximum economy.

The clearances between the elevator platform and the deck should be as small as practicable, so that the small wheels of trailers and trucks would not be seriously retarded. The speed of elevators should be great enough so that men and equipment would not be delayed. One hundred feet a minute seems to be the best speed. Elevators and winches should be placed in the 'tween decks so that cargo could be handled with the greatest efficiency. Elevator platforms should be flush with the deck.



***Special Type of Truck for Handling Farm Tractors —Lifts Rear End by Engaging Under Side of Differential Housing.***

Most of the objections to side ports are not well founded. Contrary to statements the classification societies do not forbid their use in ships operating offshore. The necessity of properly compensating for the steel removed from the ship's structure is understood.

The Matson Navigation Co. have used side ports for years in the ships running between San Francisco and Hawaii. Side ports are being used to an increasing extent in freight and passenger ships.

Another objection to side ports is that the character of cargo moving in some trades does not permit their full use. However, if side ports can be used to an extent sufficient to pay for the additional investment in three years from the economies resulting, the investment is justified. The advisability of their adoption is largely a question of economics.

Hinged side ports 9 feet by 7 feet can be provided in a new ship for $2000 to $2500 per port. In a ship already built the cost would be increased about a third.

One of the most prevalent objections to side ports is that a ship must often go to terminals when tidal or other conditions do not permit the use of the side ports. If a ship running between New York and New Orleans loads and discharges through side ports at New York but cannot load and discharge through side ports at New Orleans, the economy of loading and discharging through side ports at New York would still be great enough to make the provision of side ports economical. This illustrates the importance of proper co-ordination between ship and terminal designers, discussed earlier in the paper. Designers of new terminals must take into consideration the trend toward the greater use of side ports and must provide accordingly.

Some terminals have cut gangways, movable gangways or ramps built into the pier either at time of construction or later so that side-port ships can be worked to the fullest advantages. At Boston, where the tidal range is nine feet, the Eastern Steamship lines use tractors and trailers in handling cargo into and out of side ports. An escalator brings the trailers up the gangplank while a trailer retarder drops them down the gangplank. Cargo may be handled through side ports with conveyors.

The McCormick Steamship Co. terminal at Portland, Oreg., uses three deck elevators for working side ports. These elevators are built into the dock and make it possible to work side ports rapidly at any stage of the water level in the Willamette river. The platforms have a vertical travel of 30 feet and a platform speed of 150 feet per minute. Two and one-half tons of general cargo per man hour have been handled as compared with 1.4 tons when the ship's gear was used.

A portable elevator is also designed for use along the strongpiece of the dock.

The ships of the Bernstein line, which handle unboxed automobiles, carry elevators with them. These are used in lifting the cars from the floor of the pier to the side port.

At Quebec the Canada Steamship lines use a barge and an escalator called "barouch" for meeting the problem of handling a side-port ship at a terminal where the tidal range is over 18 feet.

Other objections urged against the use of side ports is the danger of breaking the hinges on side-port doors by their rubbing against a pier and the possibility of leakage with damage to cargo and danger to

(*Continued on Page* 66)

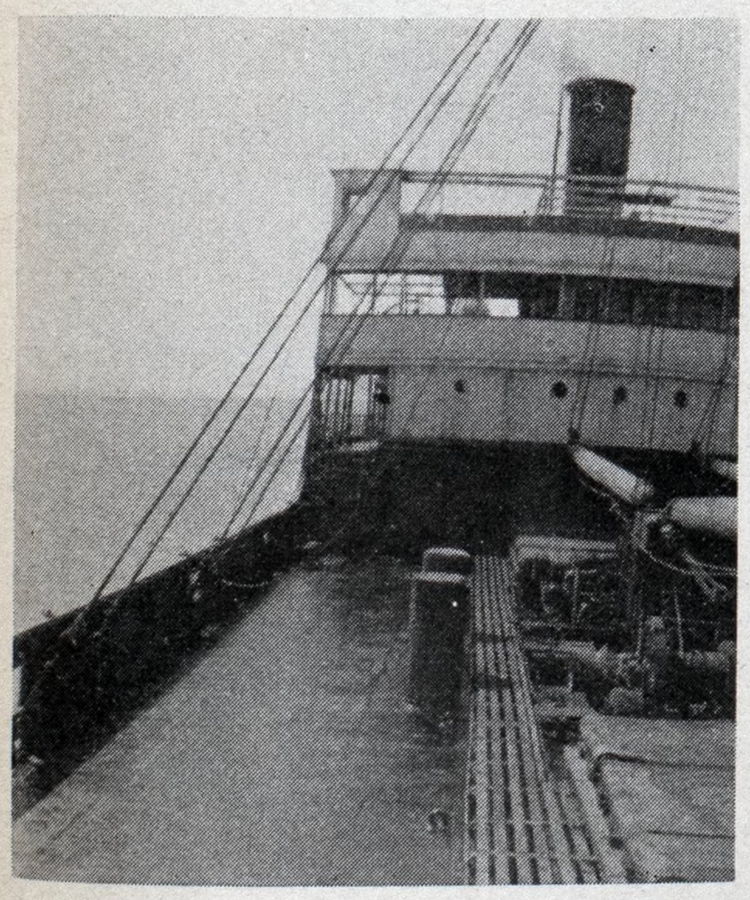
# Useful Hints on Cargo Handling

THE question of the strength of hatch covers was once more raised at the board of trade inquiry into the loss of the self-trimming steamer RADYR, which disappeared with all hands on Dec. 7, last. A wireless SOS was received from the vessel that she required assistance as her hatches were stove in, but, in view of the weather, no assistance could be sent, with the result that she was lost with all on board. The court attributed the loss of the ship to the shifting of the cargo causing a list to the breaking in of the hatches caused by the inferior quality and defective condition of some of the hatch covers, and the large area of the hatchways, which in the heavy weather experienced exposed the hatches to exceptional strain. The court was also of opinion that definite provisions and stipulations should be made in the specification for timber ordered for and used in the construction of hatch covers fitted in large and exposed hatchways on seagoing vessels, and recommended that, where covers are made of wood, they should be of high-grade, straight-grained timber free from knots, shakes and sap. The court, however, strongly urged that the question of the use of steel in the construction of such covers should be considered.

(*Fairplay*, Aug. 21, 1930)

## Trucks Show Efficiency

ELECTRIC trucks operating on a New York pier performed as follows in handling flour: The flour is brought out of the ship and piled 20 bags to the skid. Each bag weighs 140 pounds, making a total load of only 2800 pounds. The truck picked up a skid, carried it to storage 100 feet away and returned for another load at the rate of 40 to 50 trips per hour. There were times when the truck made a round trip per minute, or at the rate of 60 trips per hour, but because of delays in unloading the flour from the slings to the skids, the time necessary for the truck to pick up empty skids, etc., a fair average is 40 to 50 trips an hour. At this rate they handle 800 to 1000 bags an hour, which amounts to 56 to 70 tons.



*Ventilators Should Function in Bad Weather as Well as Good*

*THIS page is to be devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.*

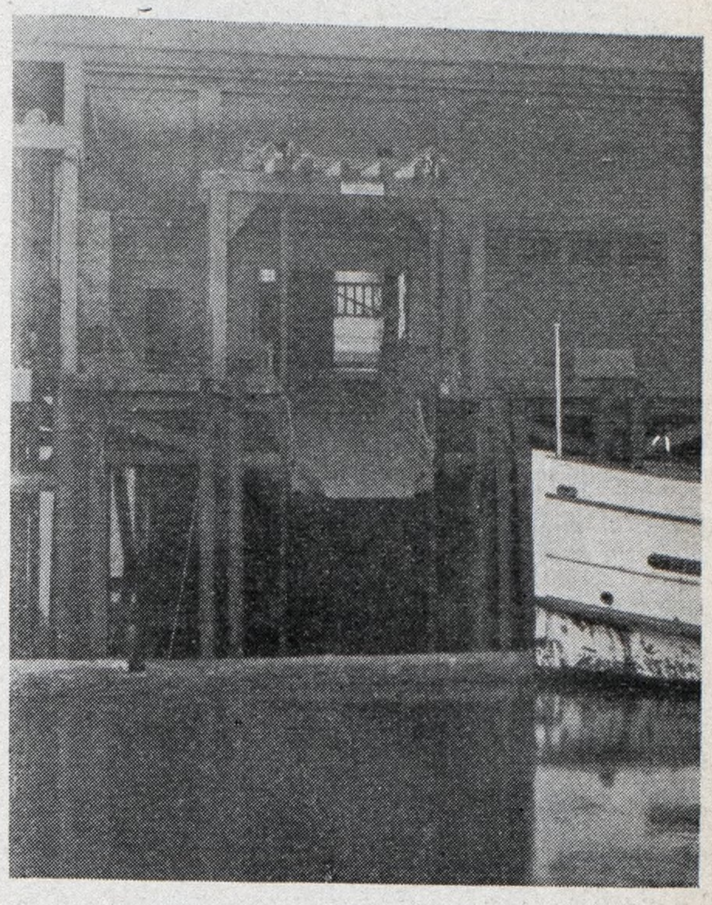
*We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.*

## On Intelligent Stowage

A SURVEYOR writes the following on co-operation between freight office and pier:

"I have seen instances of cargo being stowed below deck which has been contracted for on deck stowage. This, of course, necessitates the rehandling of this cargo and also of the cargo which has been stowed around it, resulting in breakage of packages, pilferage, delay and expenses for the ship. I have also seen cargo loaded in one port and stowed in such a way that at the next port, where large shipments of long steel were to be loaded and could always be expected, there was hardly room to handle the steel into the ship without damage to the cargo previously loaded. The simple precautionary measure of hanging a skid to protect such cargo had been neglected. Certain kinds of cargo of such nature as to be liable to cause damage to other cargo and for which special stowage is required, very often gets into a hold where damage to other cargo may be caused; this might be avoided by proper co-operation between the agencies. I have seen reports of coffee stowed in Central American ports with disinfectants from a United States port, resulting in claims for taint of the coffee.

"In the intercoastal trade the ship always loads in several ports to discharge in several ports and it is therefore of utmost importance that the various shipments by themselves and in regard to the different ports are properly marked, preferably with different colors of paint for different ports so as to prevent the overcarriage of and wrong delivery of goods. Claims for overcarriage and misdelivery are frequent."



*Barlow Type Elevators for Docks*

## Special Ship for Newsprint

THE newsprint paper for the *Chicago Daily Tribune* is brought to Chicago, from Thorold, Ont., by a specially designed ship built in England. In effect the ship has been built to fit the rolls of paper. Loading and discharging is done by special designed cantilever cranes two at each port. At Chicago the cranes have a full circle swing, a maximum radius of 46 feet and a hoisting and racking speed of 200 feet per minute with a two-ton load. The cranes at Thorold are of the gantry type. This equipment makes it possible to discharge 3000 tons of paper in 20 hours.

A new type of box car for handling lumber is being urged by lumber interests to make possible handling lumber in units of 1500 to 2000 feet which cannot be handled in open top equipment. The new type car suggested has a collapsible roof, which permits loading through the roof. It has been used successfully on Swedish railroads for three and one-half years. The use of this type of car reduces handlings. See page 53.

# Equipment Used Afloat and Ashore

## New Co2 Indicator and Recorder—Grinding Machine—Electric Radiator for Shipboard —New Stacker—New Cargo Oil Pumps—Portable Hoist with Large Capacity

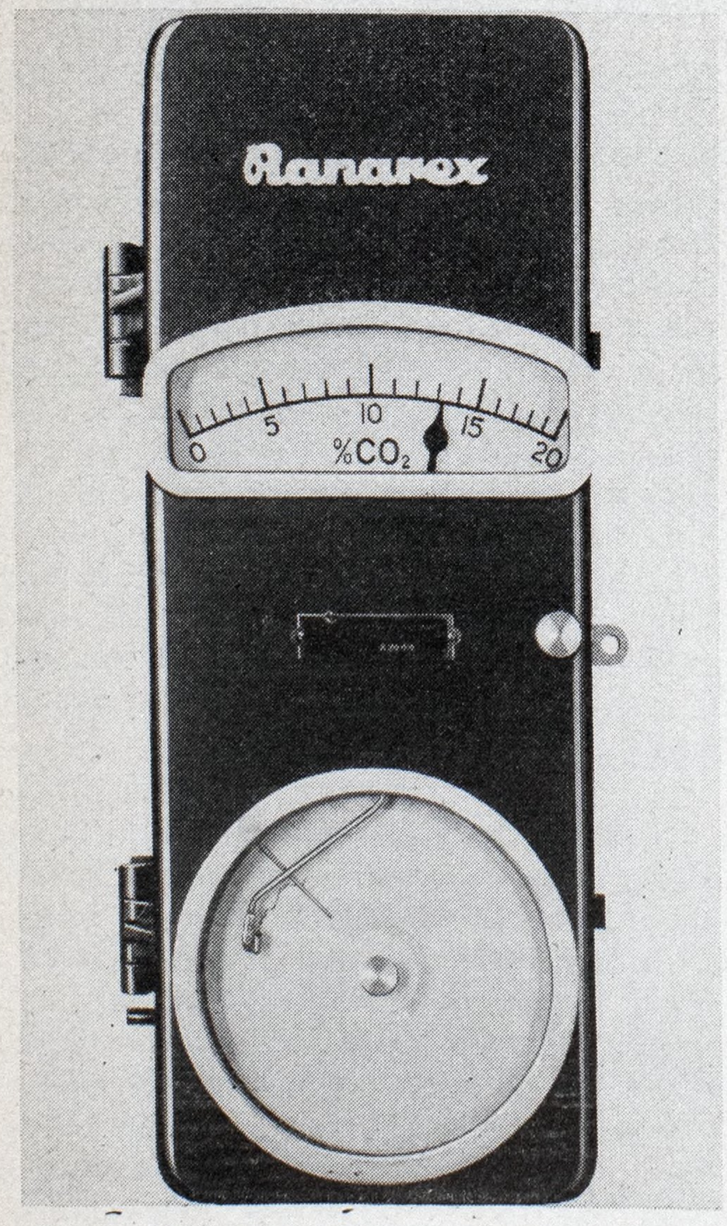
A NEW model $CO_2$ indicator and recorder by the Permutit Co., New York City, has been placed on the market. The well established principle, of older models based on specific gravity, has been retained, but the design has been simplified, and the machine made more compact and rugged.

All working parts are easily accessible. The entire indicating and recording mechanism is attached to one plate, and the driving mechanism, including the motor, to another. Both plates may be removed without the use of tools, by loosening a few wing screws; their removal opens all gas passages over their entire length. Connection between the humidifier compartments and the measuring chambers is established by channels of ample cross section.

In most instances the time lag will be less than a minute. This is of great importance to the power plant engineer and his assistants, as it enables them to correct firing conditions just as soon as a change is needed. Hence the proper percentage of $CO_2$ can be maintained at all times.

Corrosion resistant materials such as bakelite and special alloy steels are used extensively for parts in contact with flue gas. The machine is enclosed in a dust-proof cast aluminum casing and is not affected by heat, moisture or shock. It is available for wall or panel mounting as needed.

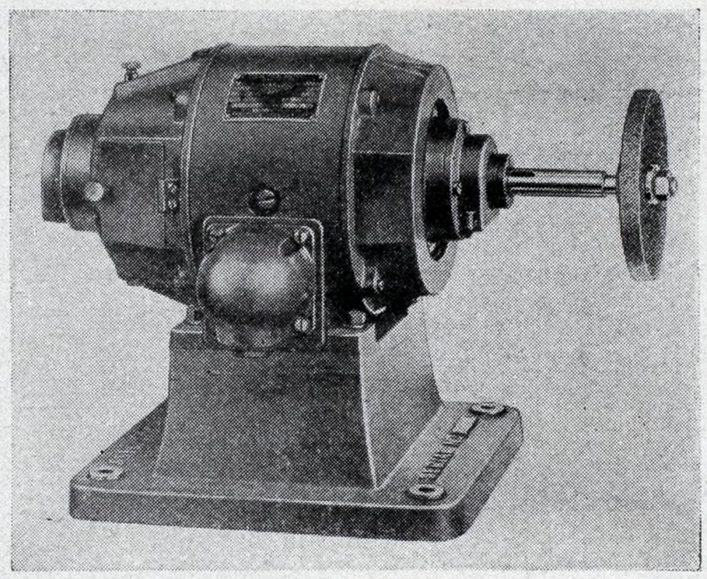
The standard 9-inch scale and circular chart 8 inches in diameter are graduated from 0 to 20 per cent $CO_2$, and accuracy with 0.3 per cent $CO_2$ is guaranteed. Scales from 0 to 30 per cent $CO_2$ for furnace gas and 0 to 40 per cent $CO_2$ are also available. The recording mechanism is driven interchangeably by a spring clock or an electric clock, as desired.




NEW WALL TYPE C02 INDICATOR AND RECORDER

## Tap Grinding Machine Has Various Sized Wheels

J G. BLOUNT CO., Everett, Mass., has developed a machine for tap grinding. This machine, driven by



TAP GRINDING MACHINE

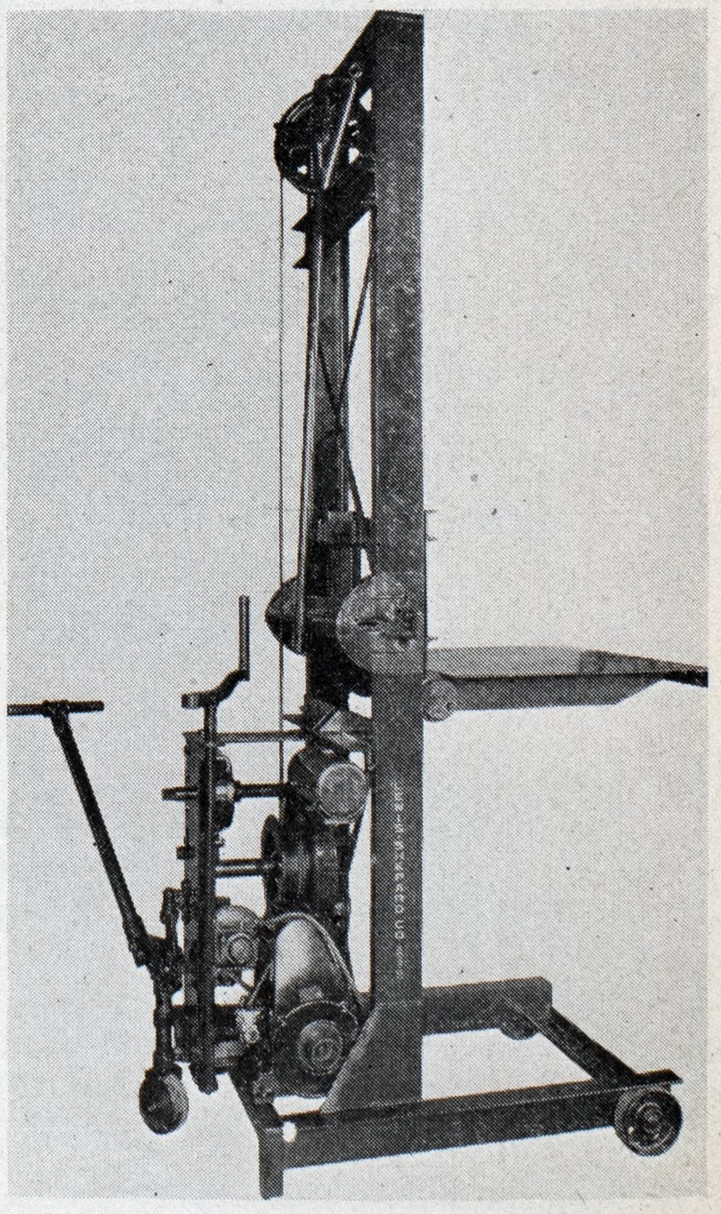
a specially designed 1¼-horsepower Westinghouse type SK motor, is applied to the grinding of tap flutes by the use of a taper arbor on the end of a spindle, using various sizes of grinding wheels. For the grinding of small taps, wheels of small diameter and width are used, while on larger taps grinding wheels up to six inches in diameter and ½ to ¾-inch wide are employed.

These grinders are self-contained, being driven by a special direct connected totally enclosed ball bearing motor with a speed range of 4000 to 7000 revolutions per minute. The motor is controlled by a field rheostat so that any grinding speed may be obtained up to 7000 revolutions per minute. A smooth finish can be obtained by the inherently close speed regulation of the drive.

## Design Electric Radiator for Ship Board Use

INTRODUCTION of Fintube radiators for installation aboard ship is said to solve many problems that have presented themselves to marine engineers and naval architects in the past. These new radiators can be concealed wherever bulkheads are sheathed or where exposed occupy but a fraction of the space of the standard cast iron radiators. Their weight complete with the decorative cabinets is said to be only one-fifth of the weight of the ordinary radiator and a saving of from 10 to 20 per cent in fuel consumption is assured by the manufacturers.

In addition to the standard types for steam, vapor or hot water systems, the Fintube Radiator Co., Inc., Long Island City, and The Marr Brothers, Inc., New York City have co-operated in designing an electrical unit that may be installed directly within the housing of the standard steam unit and a separate electric unit that may be used where it is inadvisable to run steam piping. The electrical unit possesses no parts that need recharging or renewing and its efficiency is from 20 to 35 per cent greater than any radiant or resistance type of unit now on the market according to the manufacturers. With the new electric radiator, the risk of fires due to hot wires or burns to passengers because of radiator hot front plates, is eliminated. The radiator being of the convection type draws air from the deck, passes it through the fins and projects warm air into the compartment at a speed of over 100 feet a minute. This means that the temperature of



STACKER LIFTS 1000 POUNDS 40 FEET PER MINUTE

the entire compartment is raised within a remarkably short time without projecting against pieces of furniture or an opposite bulkhead any spot of excessive heat.

## New Stacker Added to Line of Lifting Equipment

A NEW stacker, valuable for use in cargo handling in providing means for tiering and storing material so that floor space is saved, has been added to the line of lifting equipment manufactured by the Lewis-Shepard Co., Boston. This stacker is gas engine powered. It is operated by a compact 2½ to 3 horsepower air cooled four-cycle engine and will lift a 1000-pound load at the rate of 40 feet per minute. Lowering the load is taken care of by decelerator control which prevents undue speed.

Being powered with a gasoline motor, this unit is not dependent upon electric lines for power.

## Develop New Cargo Pumps for Use on Oil Tanker

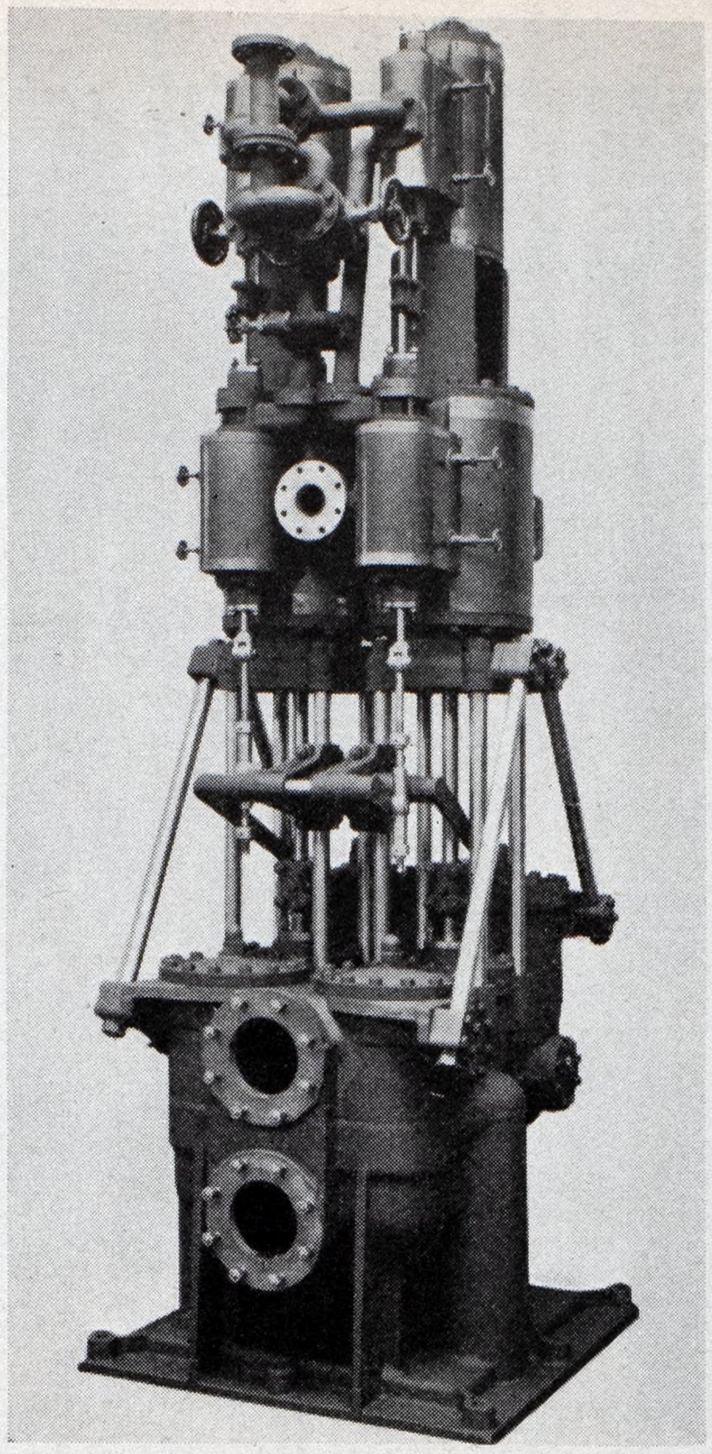
APART from the engine room reciprocating pump equipment of the tanker VIRGINIA SINCLAIR which consists entirely of modern pumps, there are the large and numerous cargo pumps of a design and distribution not used heretofore on tankers.

The pumps are shown in the accompanying illustration. They are of the Warren vertical duplex valve pot design with 8-inch diameter high pressure and 14-inch diameter low pressure steam pistons, 10-inch diameter liquid pistons all having a common stroke 18 inches. The steam ends are made of a special quality of high tensile iron developed by the manufacturers for use with high pressure and high temperature steam. Balanced piston steam valves working in lined chests are employed to give better and more lasting operation without the necessity of lubrication.

These pumps are capable of operating with full boiler pressure (400 pounds gage). The steam cylinders are piped and valved so that they can be operated as compound units, or, in the event of operation with low pressure steam or air when cleaning ship, as simple units with the high pressure cylinders by-passed.

The liquid ends are designed with due regard to the service for which the pumps will be used. All valve and port areas are proportioned to handle heavy oils as well as the lightest of distillates. Such provision is necessary on account of the many novel features in this ship. The six center and 12 wing compartments provided by the two longitudinal bulkheads make it possible to carry as many different grades of oil.

Each of the three pump rooms is

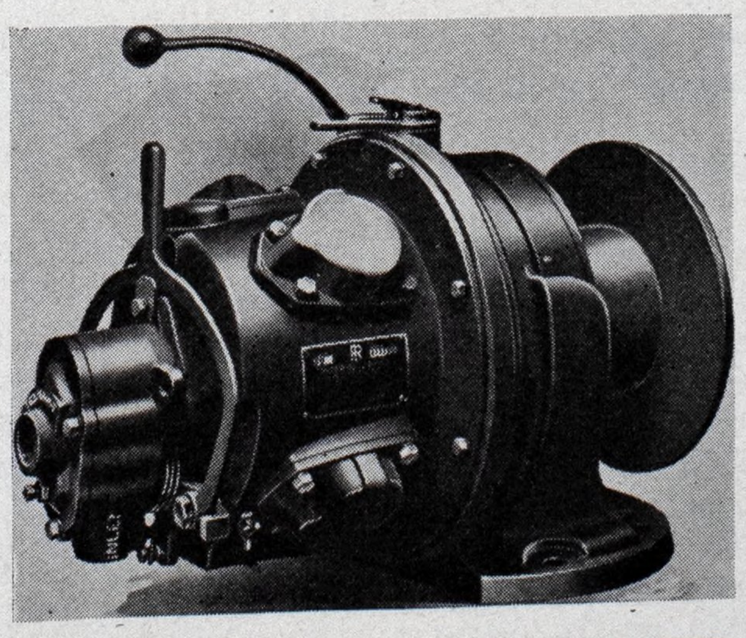


CARGO PUMP HAS 1000 BARRELS PER HOUR CAPACITY

connected by its own piping to each compartment so that any pump or pumps can be connected to any ship's tank or tanks and thus reduce to a minimum the stay in any port—a most important consideration for the profitable operation of ships.

The design and materials used in all parts were selected with great care. Among them may be mentioned the steam pistons which are of the high pressure design, the metallic packing for the steam piston rod and valve rod stuffing boxes. The liquid pistons are of the Sinclair standard; the valves are of Tuffite with bronze bushings working on stainless steel sleeves.

Each of these pumps has a nominal capacity of one thousand barrels of oil per hour, but can deliver greatly in excess of this volume. Their design was developed by collaboration of the Sinclair engineers, the shipbuilders, the Warren Steam Pump Co., Warren, Mass., and their representatives.



PORTABLE HOIST HAS VARIED USES

## Portable Hoist Has 2000-Pound Lifting Capacity

A PORTABLE hoist, suitable for the marine field with a lifting capacity of 2000 pounds has been placed on the market by Ingersoll-Rand Co., New York City.

"Utility" hoists, in capacities up to 1500 pounds, have been used by miners and contractors for the past three years. The addition of the 2000-pound size makes this type of hoist available for additional classes of work.

The uses for these hoists are varied. In construction work they are used on derricks for hoisting buckets in caisson work, pulling cars, skidding timbers, handling pipe, and operating clamshell or orange-peel buckets. They can also be used for hoisting material, erecting tanks and smokestacks, pulling sheet piling, and driving piles.

The fact that the hoists are of comparatively light weight permits them to be readily moved about wherever there is work to be done. The hoists can be bolted to a timber or mounted on a post or steel column in any convenient location.

The hoist employs a radial, four-cylinder, counterbalanced, reciprocating-piston type air motor, which is reversible. All wearing parts and cylinders are easily renewable, and interchangeable.

The reduction gears between the motor and drum are all machine-generated spur gears cut from carefully selected materials, and, wherever necessary, they are heat treated to insure ample strength and wearing qualities. The gears are completely enclosed in a housing, which excludes all dust and permits the gears to operate in a bath of semifluid grease.

Ball and roller bearings are used at all points where they will add to the efficiency and life of the hoist.

The bronze throttle valve is tapered and is fitted into a bronze bushing. Its ease of operation, sensitive graduation, adjustment for taking up wear, and extremely simple design are outstanding features.

A clutch of the positive jaw type is used to disengage the motor. This clutch is thrown out by an eccentric shaft controlled by the clutch lever. This lever is conveniently located on the top of the hoist and automatically locks to hold the clutch either engaged or disengaged.

A brake of the bank type wraps the drum at its largest diameter. The operating lever for the brake is conveniently placed and may be adjusted to any one of six operating positions. The motor is completely enclosed in a dust and dirt-proof case.

# Personal Sketches of Marine Men

## J. Howland Gardner, President, New England Steamship Co.

*Photo by Underwood & Underwood*

HIS interest in ships, their design and construction has been of that keen order which spells success in any chosen work.

QUALIFICATIONS as an administrator and his relations with employes and men of affairs stamp him as a man of unusual talent.

HIS election as president of the Society of Naval Architects and Marine Engineers is an honor he deserves as a tribute to his career.

AT THE thirty-eighth general meeting of the Society of Naval Architects and Marine Engineers, held at New York, Nov. 13 and 14, J. Howland Gardner, president of the New England Steamship Co., was elected president for a term of three years.

He was born Feb. 28, 1871, at Newport, R. I. His father was Capt. S. A. Gardner, formerly superintendent of the Norwich and New London line, and later general manager of the Fall River line.

John Howland Gardner graduated from the Massachusetts Institute of Technology in 1894, where he took the course in mechanical engineering, and also the course in naval architecture and marine engineering. After graduating he entered the employ of the New York, New Haven & Hartford railroad as assistant to the chief engineer. Through promotions in various grades he became superintendent of marine construction, June 1, 1904, and was elected vice president in charge of operation and construction of the New England Steamship Co., Feb. 7, 1913.

On Feb. 12, 1929, he was elected president of the New England Steamship Co., and on March 12 of the same year he was also elected president of the Hartford & New York Transportation Co.

During his 36 years of service he designed, among other vessels, all of the marine floating equipment now used by the New Haven company.

Except for a short period during the World war, he has since 1913 been chairman of the equipment committee of the president's conference committee, which represents all of the railroads in the United States on questions relating to valuation of railroad equipment, such as cars, locomotives, shops, machinery, tools and floating equipment.

During the World war he was one of the five naval architects and marine engineers in charge of reconditioning, repairing and operating the German and Austrian vessels that were seized by the government. After the German vessels were repaired and the operating organization completed, Mr. Gardner was sent by the United States on a confidential mission to Peru, with instructions to examine, appraise, and with full power to negotiate for our government for the purchase or charter of the German vessels that had been seized by Peru. As a result of this mission the United States secured all of this tonnage, and they were repaired by the government works at the Panama canal in accordance with Mr. Gardner's plans and specifications.

He was also one of the five naval architects and appraisers that appraised all of the merchant vessels taken by the United States shipping board from the Great Lakes.

Before his election to the office of president of the Society of Naval Architects and Marine Engineers, Mr. Gardner was vice president of that society, besides being a member of the executive committee. He is a trustee of the Engineers club, and chairman of the admissions committee.

Mr. Gardner is also a member of the board of trustees of the Webb institute of Naval Architecture. His residence is at Lyme, Conn.

In seconding the resolution on the retirement of Mr. Ferguson as president of the Society of Naval Architects and Marine Engineers, Mr. Gardner said:

"There is one point that Mr. Wetherbee did not touch on, which to my mind is one of the outstanding things that Homer Ferguson has done. He has constantly before him the wish, the desire, and the ability to help others to progress along the line of naval architecture, marine engineering, and the operation and management of vessels. You can go aboard hundreds of ships that are now flying the American flag, and you will find there young men who have been trained by the great shipbuilding company that Homer Ferguson is the head of. It has always been his thought to help the young men. This, to my mind, Mr. chairman, is one of the outstanding things that Homer Ferguson has done.

"He has given us the material things, and he has helped, at the same time, the young men who must come up and take our places as time goes on. It, therefore, Mr. chairman, gives me great pleasure and a great honor to second this motion."

## Turn Around of Liner

(*Continued from Page 27*)

and cribbage tournaments, concerts and swimming are some of the most popular amusements.

Sailing day comes round and the ship is advertised to sail at midnight and embarkation of passengers to commence at 8 p. m. On this day the captain again visits the custom house to "clear" the ship and recover the ship's register. He then visits the British consul to report any deserters or changes in crew, and recovers the ship's articles. During the afternoon the captain accompanied by the heads of departments makes a thorough inspection of the passenger quarters to ensure that all is spick and span, ready for passengers.

By 6 p. m. all cargo is on board and hatches battened down. There is 500 tons of general cargo and 200 tons of fruit, in refrigerator boxes. The general consists of packages of hardware and tools, machinery and parts, rubber and rubber goods, leather and leather goods, photo material, cotton and silk goods, bags of flour, cases of corsets, magazines and periodicals, auto and tractor parts, cans of films, etc.

At 7:30 p. m. five gangways are rigged, lighted, and manned by quartermasters and stewards who will regulate traffic up and down of passengers and numerous visitors. At 9 p. m. engines, steering gear, steam whistles, telegraphs, navigation lights, bulkhead doors and all navigational appliances are tested and a report made to the captain. The ship is now fuelled, watered, stored and loaded, ready for sea. The draft and free board are carefully observed and the density of the dock water taken. The chief officer then checks up all the various weights on board and calculates the metacentric height, indicating the measure of initial stability. All these details are supplied to the marine superintendent and captain before the ship sails.

At 11:30 p. m. all visitors are urged ashore and gangways gradually removed. Punctually at midnight the last gangway is landed, moorings cast off and the ship backs into the river and commences her voyage. Two hours later, off Ambrose channel light vessel, the pilot leaves, the engines are rung "full speed ahead" and our course is set for England, home and beauty. It may be remarked that a ship like the LEVIATHAN or BERENGARIA, passing from fresh water to salt water, rises bodily, ten inches. Between the dock at New York and the open sea, average rise is four inches.

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On Nov. 1 George B. Drake, marine architect, opened an office in the Whitehall building, 17 Battery place, for commercial ship design, consultation in marine transportation, vessel surveying and appraisal and the purchase and sale of marine equipment. Mr. Drake, formerly engaged in this line of work, left the field in 1913 to join the marine department of the Texas Co.

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## Export Line Contracts to Move Soviet Freight

The Export Steamship Corp., New York, on Nov. 6 signed a contract to carry all freight out of north Atlantic ports to the Black Sea ports of Soviet Russia with the Am-Derutra, representatives in the United States for the Soviet Union. This contract, which was signed by Henry Herbermann, president of the Export line and S. E. Sachs, representing the Am-Derutra, is for three years and indicates that the Soviet government, which already has purchased American products in excess of $100,000,000 in value expects to continue its purchases in this country for three more years. It is expected to begin the new service before the end of November.

The Export line and the Am-Derutra entered into a one-year contract a little over a year ago, under which large quantities of freight were moved. The new contract will afford employment to many jobless American officers and seamen. Ten of the present fleet of 24 Export vessels will be used in the service to the Black Sea and if additional tonnage is required the company will charter ships from the United States shipping board.

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## Yale & Towne Executive

After a four-day illness, Edward Conrad Waldvogel, a director and vice president of the Yale & Towne Mfg. Co., Stamford, Conn., died at his home in New Rochelle, N. Y. on Nov. 13. Death was due to pneumonia.

Mr. Waldvogel had been connected with Yale & Towne for over a quarter of a century and played an important part in the development and continued prosperity of the company. He was widely known throughout the hardware trade and possessed a keen and resourceful psychology of salesmanship.

Mr. Waldvogel was born in Toledo, O., and entered the Yale service in 1905 as a traveling salesman. In 1910 he was transferred to New York as assistant to the general manager, being officially appointed assistant general manager in 1912. He succeeded Mr. Walter C. Allen, the present president of the company, as general manager in 1916 and on March 11, 1920, was elected a director and on March 8, 1923, vice president.

## Merger Involves Important Pacific Coast Line

Announcement was made on October 30 of the merger of the Matson Navigation Co. and the Los Angeles Steamship Co. No change is anticipated in the present organization or personnel of either company. The Matson company will continue all of its present services, and the Oceanic Steamship Co., a subsidiary of the Matson line, will not be affected in any way by the merger. Operations out of Los Angeles will continue under the name of the Los Angeles Steamship Co. and under the direction of the present officers of that company.

The Matson Navigation Co. is the owner of a fleet of 22 steamers headed by the modern liner MALOLO, all engaged in the Hawaiian trade. The company also operates the Oceanic Steamship Co. and is also a joint owner with the American Hawaiian Steamship Co. of the Oceanic & Oriental Navigation Co., operating freight services to New Zealand, Australia, Japan and North China; Philippines and South China. It also has under construction three new modern liners to cost approximately $24,000,000, two of which will be delivered in the spring of 1932.

The Los Angeles Steamship Co. is the owner of three steamers, operating in the Hawaiian island trade, two steamers in the coastwise trade and four freighters in the intercoastal trade.

This merger will result in a large and powerful steamship organization operating under the American flag and will help to build up the American merchant marine, especially steamship services on the Pacific ocean.

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## Joins Machine Works

William E. Colley has resigned his position in the marine sales department of the Westinghouse Electric & Mfg. Co., South Philadelphia works to accept a position as sales engineer with the Kingsbury Machine Works, Philadelphia.

Mr. Colley has had a long and varied experience in marine work having gone to sea as both a licensed engineer and in the navy. For the past 11 years he has been continuously employed in marine service and sales engineering work with the Westinghouse company.

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Charles M. Wales, 67, died suddenly on Nov. 1 at his home in Englewood, N. J., of pneumonia. He was a member of the council of the Society of Naval Architects and Marine Engineers and of the Engineers Club, having served the latter as its treasurer for more than 12 years and as a member of its board of governors for nearly 30 years.

## Design and Cargo Handling

(*Continued from Page* 56)

ship. Naval architects can design side ports with hinges so arranged or protected that they cannot be broken, and this seems to be taken care of in new ships.

Cargo handling and stowage facilities and arrangements should be designed with special regard to the safety of the cargo and of the men who handle the cargo. Damaged cargo has been frequently caused by "sweating," or lack of proper insulation in the cargo spaces, and from improper or poor ventilation. Recently designed ships will be quite superior to the older ships in these respects. Poor or inadequate lighting, both in the ship and on the piers, is a source of accident to the men and of damage to cargo. The great benefit to better and faster cargo handling from the most modern electric lighting methods is not generally appreciated. In many industrial plants, during the past few years, it has been demonstrated that the better lighting has resulted in an average increased production of nearly 15 per cent, in addition to improved quality of work, better morale of the men, and a very great decrease in accidents.

Better and faster cargo handling facilities, properly used and supervised, result in greatly reduced costs of handling cargo, in a much shorter time. The greater result or effect, however, on the net earnings of the ship over a year's period, comes about from the quicker "turn-around" or the reduction of the number of days in port. The true effect of this improvement in "Port speed" has never been generally appreciated in economic terms. The discussion to follow will attempt to present this most important factor of all the cost factors in ship operations in a new light.

The customary and time-honored method of keeping costs in shipping is by "expenses per voyage," and hence we use that method for our first set of figures and chart but later transform the results into "expenses per annum" and "net earnings or profits per annum," which of course is the correct way to arrive at the answer we seek.

In the solution, as will be seen, it is immaterial what length or mileage of the assumed "voyage" we select, as we can easily translate the figures into mileage per annum, number days in port annually, etc.

We can assume any per cent of capacity or full cargo we wish for our calculations, providing we hold to the same figure throughout. The figure used (whether 50 per cent, 60 per cent, 70 per cent or 80 per cent of full capacity per voyage) largely determines the estimate for "total revenues" per voyage.

For convenience of calculating and plotting, the "voyage" of a 10,000-ton deadweight vessel is taken as 14,400 sea-miles, giving sixty days at sea for a 10-knot vessel, and fifty days at sea for a 12-knot vessel.

Table 1 shows the number of voyages per annum for various sea speeds and port speeds.

The expenses and revenues per annum for two cargo ships (12 knots and 16 knots) are estimated in Table 2, holding to the same variables or conditions for both ships except in the matter of "sea speed."

"The net per cent return per annum on the owner's investment" figures out 12.92 per cent for the slower vessel and 5.83 per cent for the faster vessel. We can change any of the variables and figure out the results accordingly.

If we now vary or increase the "port speed" we get other valuable comparisons. Case 1 is the increase in "sea speed" only.

*Case* 1.—By the increased "sea speed" only (16 knots sea speed instead of 12 knots) the number of voyages (and gross revenues from "traffic") is increased 16.4 per cent but the per cent return on owner's investment drops from 12.92 per cent to 5.83 per cent.

*Case* 2.—By keeping 12 knots as the "sea speed" but increasing the "port speed" (reducing the number of days in port) by 30 per cent, which in many cases is quite feasible with better cargo handling features, facilities and methods installed both in the ship and at the piers, we get the same increased revenues as in Case 1 without the additional expense. The "financial returns" figure out a remarkable result (with "net profits" *double*) as follows:

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*Expenses per Annum:*

| | |
|---|---|
| (*A*) Fixed charges, as before (Table 2) | $150,000 |
| (*B*) Semi-fixed charges (Table 2) | 185,000 |
| (*C*) Variable charges, 16.4 per cent more than in Table 2 | 285,180 |
| Total Expenses | $620,180 |
| Total Revenues | 752,000 |
| Net Profits | 131,820 |

*Note:* If the additional capital outlay for better facilities is $100,000, the per cent "Return on Total Investment" of the owner is ..... 21.97%

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In addition to this doubling of the "net profits" we also get an improvement in "cargo handling costs," amounting to about 20 per cent of $130,000 or $26,000 a year. If we include this in our increased profits, we get 26.3 per cent return on the total investment of the owner.

*Case* 3.—By increasing both the "sea speed" (12 to 16 knots) and the "port speed" (by 30 per cent), we get the following results:

Voyages per annum increased to 5.6 (19 per cent over Case 2).

---

*Expenses per Annum:*

| | |
|---|---|
| (*A*) Fixed charges (Table 2) | $192,000 |
| (*B*) Semifixed charges (Table 2) | 203,000 |
| (*C*) Variables charges (increase 19 per cent over Case 2) | 383,180 |
| Total Expenses | $778,180 |
| Total Revenues increase 19 per cent over Case 2) | 853,230 |
| Net Profits | $75,050 |

If the additional capital outlay for better facilities, etc., is $100,000, the per cent "Return on Owner's Total Investment" will be ..... 10.70%
Compare Case 1 return of..... 5.83%
and Case 2 return of..... 21.97%

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The above figures are approximate only, of course, but are close enough to actual cases to demonstrate the tremendous importance of "cargo handling" problems, and shows how much may be expected during the next few years.

Reducing time in port not only benefits the economies of the ship but also those of the terminal.

At the present time, when so many combined passenger and cargo vessels are either building or proposed as a result of mail contracts or other benefits afforded by the merchant marine act of 1928, rapid and economical cargo handling facilities on the ship are of the utmost importance.

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TABLE 3

**Comparative Fuel Costs**

10,000-ton deadweight cargo vessels (assumed "Voyage" of 14,400 sea miles)

| | | | Oil per voyage | | |
|---|---|---|---|---|---|
| Knots speed | Sea days | S.H.P. | Fuel oil tons per day | Total fuel tons | Cost at $5 ton |
| 10 | 60 | 1,900 | 19.26 | 1,155 | $5,775 |
| 12 | 50 | 3,650 | 34.76 | 1,738 | 8,690 |
| 14 | 42.86 | 5,800 | 54.30 | 2,427 | 12,135 |
| 16 | 37.5 | 9,200 | 84.66 | 3,176 | 15,880 |

For fuel used "in port," figure about 10 per cent of the fuel used "at sea" for average conditions, and add to the above figures.

*Note:* Above was figured from data issued October, 1928, by National Council of American Shipbuilders.

# New Trade Publications

SKID PLATFORMS — The Lewis-Shepard Co., Watertown Station, Boston, manufacturers of jacklifts, stackers, and steel frame platforms, has issued a bulletin devoted to its four-way platforms, which are arc-welded. Illustrations are given of various types of platforms, jacklifts and stackers.

HISTORY OF COMPANY—The B. F. Sturtevant Co., Hyde Park, Boston, has issued an attractive brochure entitled *An Air Castle.* This little booklet gives a brief sketch of the founding and history of the company from 1864 down to date. It also shows a few of the many products made by this firm. Copy of the booklet will be supplied on request.

ELECTRICAL APPLIANCES—General Electric Co., Schenectady, N. Y., has issued a number of bulletins recently, including: Welding electrodes; heat treatment of steel in electric furnaces; conveyor furnace; air-draw furnace; phase protective panels; direct-heat electric furnaces; low-speed synchronous motors.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued several bulletins on various kinds of equipment, including quartz-rod thermostat, fractional horsepower motors and motor parts, direct-current crane and hoist motors, general purpose squirrel-cage induction motors and crane equipment.

CRANES—Under the title "Maximum Lift in Minimum Headroom" the Whiting Corp., Harvey, Ill., has issued a folder descriptive of its new Himlow Hi-lo cranes. High lift, with low headroom, simple design, easy accessibility, roller bearings, oil-tight gear case, sturdy gearings are some of its features. Folder includes a diagram and table of clearances.

ELECTRICAL EQUIPMENT—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has issued its general catalog for 1931-1932, covering its entire line. An instant index has been included as a feature facilitating immediate reference to any section of the book with a minimum of search. Various indexes assist in finding the object sought.

DIESEL YACHTS—Cox & Stevens, 521 Fifth avenue, New York, have issued the fourth edition of their booklet on diesel yachts. The booklet contains a description and illustration of each of the 45 yachts of considerable size equipped with diesel engines which have been designed by Cox & Stevens. A list of owners of yachts of all kinds designed by the company is also included in the book.

WELDING WIRE—A handbook for welders has been issued by the American Steel & Wire Co., a subsidiary of the United States Steel Corp., Cleveland and Chicago. The science of welding and use of proper rods form part of the discussion and products of the company for this purpose are described. American Welding society specifications for electrodes and welding rods are included.

BATTERIES—Chloride Electrical Storage Co. Ltd., Clifton Junction near Manchester, England, in its catalog on marine batteries entitled *Standby Power* devotes Part I to conceptions and applications of marine electricity and Part II to marine battery types, giving capacities, dimensions and weights. The Chloride company is represented in this country by the Electric Storage Battery Co., Philadelphia.

BOILERS—James T. Castle, merchant engineer, Pittsburgh, is distributing a bulletin of the Union Iron Works, Erie, Pa., describing its type of boilers designed for limited space conditions and combining dry steam, unrestricted circulation, high efficiency and reliability. Diagrams and tables of data complete the description of the boilers.

CRANES—A handbook of crane information, based on 35 years of experience in manufacturing, has been compiled by the Whiting Corp., Harvey, Ill., to bring to the crane user and prospective buyer useful information not found in catalogs. It contains technical and practical information designed to be of value to executives and engineers and is designed to bring about a closer relationship between industry and the crane manufacturer.

WORLD PORTS—A directory listing 700 ports served by its 82 ships has been issued by the General Steamship Corp., 240 Battery street, San Francisco. The booklet also presents a detailed description of the service of the nine lines operated by the company out of Pacific coast ports. Traffic managers will find the directory a handy guide in the routing of shipments through Pacific coast ports. It is also a reference for the correct spelling and location of strange and far-off ports.

DRIVES—Goodyear Tire & Rubber Co. designed a special endless V-shaped rubberized cord belts, and the Worthington Pump & Machinery Corp., Harrison, N. J., designed the sheaves and solved the problems of application. The latter will manufacture the sheaves and sell the complete drive, adapting it to each installation requirements. How these two companies collaborated in "Harnessing Industry Anew" is told in a folder issued by the Worthington company.

# Business News for the Marine Trade

The Chamber of Commerce, Victoria, B. C., is considering the establishment of a hydroplane base in Victoria harbor.

The American Can Co., A. W. Quist, Exchange building, Seattle, has a permit to build a dock at a cost of $500,000.

The plant of the Fernandina Boat Building Co., Fernandina, Fla., was recently damaged by fire. Loss is estimated at $13,000.

The Cohrone Boat Co., New York, has been incorporated with $100,000 capital by E. Tucker, 1501 Broadway, to deal in tools.

The Wheeler Shipyard, New York, has been incorporated with $1000 capital by A. J. Stern, 26 Court street, Brooklyn, N. Y., to deal in vessels.

A barge was destroyed and another barge and 500 feet of the Lehigh Valley railroad ore dock in Buffalo harbor were damaged by fire recently, the loss being estimated at $55,000.

The Capitol Marine Garage, Inc., was recently incorporated under the laws of Delaware by Carl C. Grimes, Washington, D. C., to operate a general marine dock; 1000 shares, no par value.

Brake-Sorg Boats Inc., 2206 Twelfth street, Detroit, has been incorporated with $100,000 capital by Theodore R. Drake to manufacture and deal in boats, motors and accessories.

A survey was recently completed for the chamber of commerce and Tampa Shipbuilding & Engineering Co., Tampa, Fla., by William T. Donnelly, marine engineer, 247 Park avenue, New York, covering the probable construction of a floating dry dock at a cost of $1,600,000. The recommendations include the construction of a dry dock with 10,000-ton lifting power capable of handling vessels up to 550 feet long. A site of 49 acres on the Ybor channel is under consideration.

The New Jersey Ship Yards Inc., Elizabethport, N. J., has been incorporated with 1000 common shares by E. A. Vosseler, 200 Broadway, New York.

The Canulette Shipbuilding Co., A. D. Canulette, president, has started preliminary construction for a steel fabricating unit addition, 40 x 140 feet, to house cranes and other machinery. The cost is estimated at $35,000.

Rainbow Craft Ltd., care of S. D. Terry & Co., Canadian Pacific building, Toronto, Ont., proposed to build a 40 x 200-foot plant at Gravenhurst, Ont., at a cost of about $35,000. The company will install machinery equipment for the manufacture of boats.

A passenger and freight steamer service will be established during the coming winter between San Francisco and Manzanillo, Mexico, by the Pacific Navigation Co., according to a statement made by Daniel Schober, president of the company. Two steamers will be used.

Bids will be asked about Feb. 1 by the Orleans Levee Board, John Klorer, engineer, Camp and Common streets, New Orleans, for improving various canal levees to cost approximately $380,000, $500,000, $85,000 and $195,000 and on the construction of two stretches of seawall to cost approximately $328,000 and $215,000.

The Ohio River Boat Co., Cincinnati, O., through J. B. Koehler, care Hotel Alms, recently announced that it had let contract to Mason & Shapiro for a yacht storage plant with capacity of 1000 boats. A machine shop will be included. The plant will be built on the Ohio river near Coney Island at a cost of $200,000. Roy A. Steinharter is president of the company.

The Peninsular Terminal Co., Carl G. Fisher interests, Miami Beach, Fla., which will inaugurate freight car ferry service between rail terminals and the island, recently let a contract for $100,000 development of Peninsula Terminal Island, formerly Fisher's island. The contract provides for freight car ferry transfer, bridges, pontoons and railway and terminal facilities.

The board of commissioners of the port of New Orleans, John McKay, general manager, New Orleans Court building, New Orleans, is planning the enlarging and reconstruction of three wharves in 1931 at a cost of approximately $1,000,000. Bids are also being asked for the installation of automatic sprinkler systems under the wharves and sheds of all New Orleans docks at a total cost of from $1,000,000 to $1,300,000.

# Marine Review

Reg U.S. Pat. Off.

*The National Publication Covering the Business of Transportation by Water*

**December, 1930**



# OXWELDING

## *adaptable to any metal*

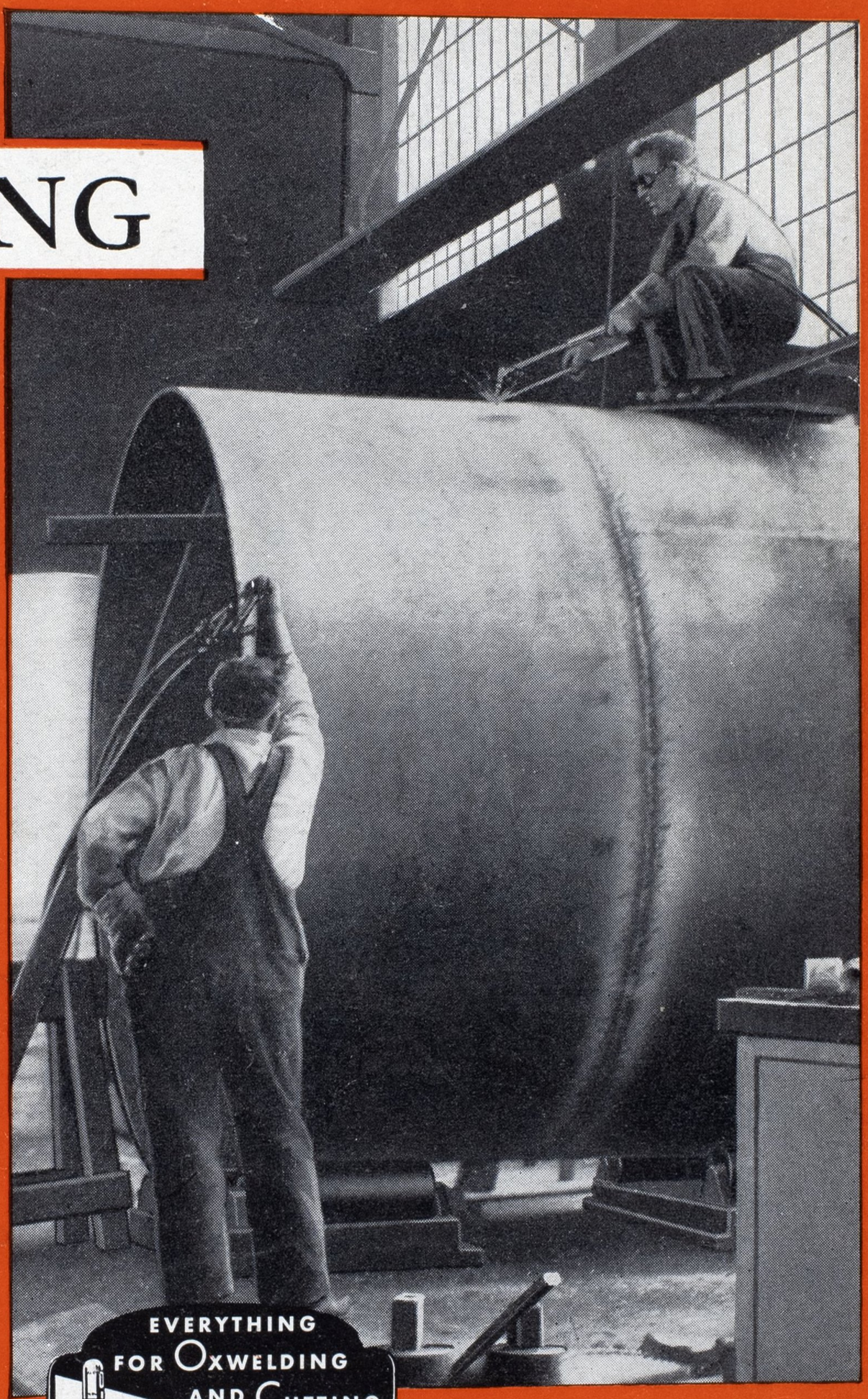
Any commercial metal—steel, cast iron, practically all ferrous and non-ferrous alloys and non-ferrous metals—can be welded by the oxy-acetylene process.

Oxwelded joints are strong and tight—permanent and trouble-free. Wide adaptability to all kinds of metals and all sorts of equipment makes oxy-acetylene welding indispensable in every industrial plant.

THE LINDE AIR PRODUCTS COMPANY....THE PREST-O-LITE COMPANY, INC. . . . OXWELD ACETYLENE COMPANY . . . UNION CARBIDE SALES COMPANY... UNITS OF

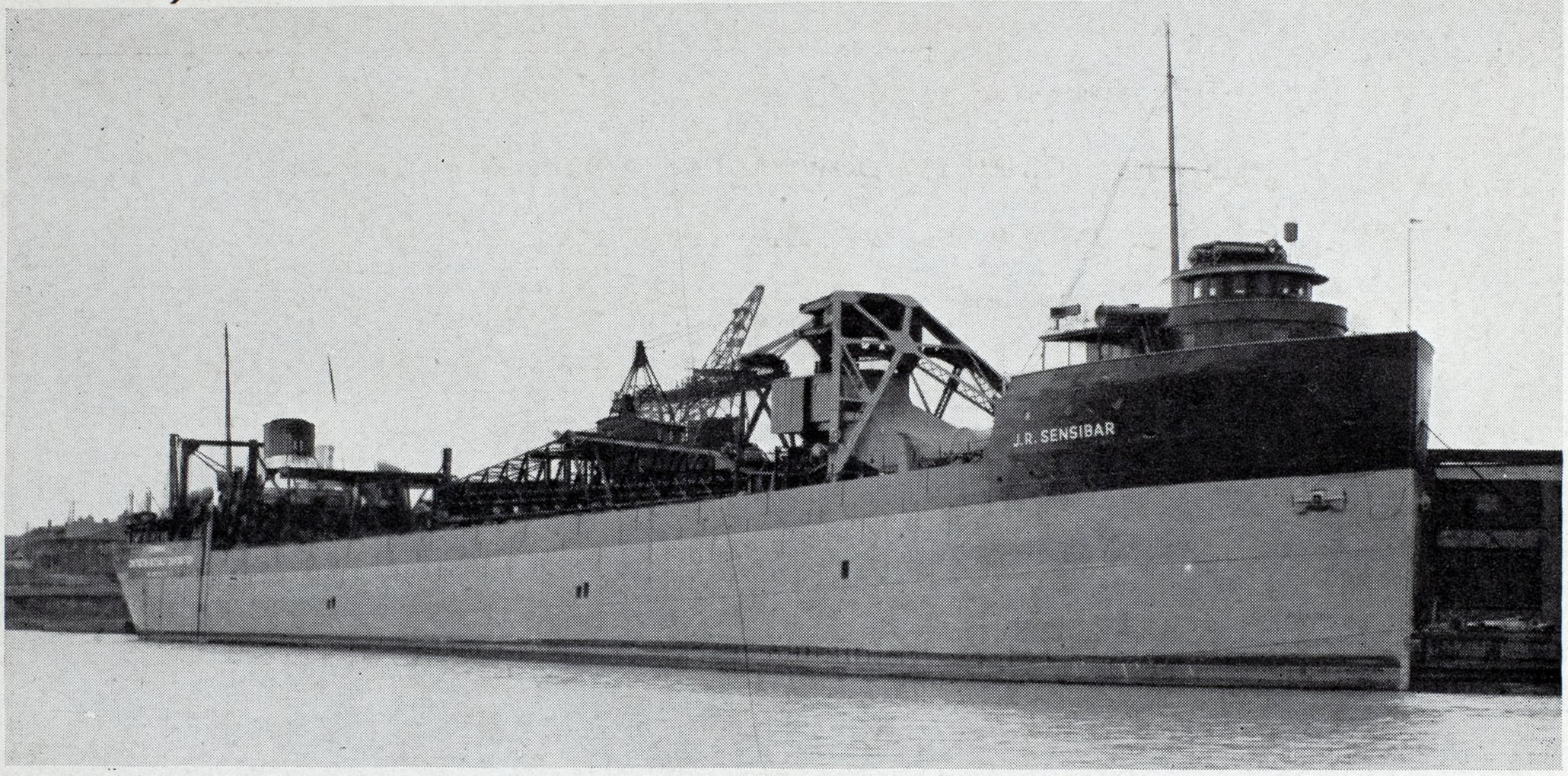
UNION CARBIDE UCC AND CARBON CORPORATION

General Offices . . New York Sales Offices . . in the Principal Cities 65 Linde plants.... 48 Prest-O-Lite plants... 174 Oxygen Warehouse stocks... 156 Acetylene Warehouse stocks....42 Apparatus Warehouse stocks....245 Union Carbide Warehouse stocks



# T. E. S. S. J. R. SENSIBAR

**Self unloading carrier of dry bulk cargoes.**
**Self propelled hydraulic hopper dredge.**
**Pipe line reclamation dredge.**
**Sand Sucker.**




**This, the most modern, complete, and versatile ship ever constructed is equipped with the**

# »»OERTZ STREAMLINE RUDDER««

## OERTZ RUDDERS

for GREATER SPEED

DECREASED VIBRATION

LESS FUEL

BETTER MANEUVER-ABILITY

**Progressive shipowners and naval architects specify the OERTZ RUDDER.**

**Existing rudders can be converted without necessitating any change in rudder stock or steering gear.**

*A few other representative modern ships equipped with OERTZ RUDDER:*

| | |
|---|---|
| S. S. YOUNGSTOWN | Interlake S. S. Co. |
| S. S. EDWARD G. SEUBERT | Standard Oil Co. of Indiana |
| S. S. G. HARRISON SMITH | Standard Oil Co. of N. J. |
| Q.S.T.S. BREMEN—46,000 Tons | North German Lloyd |
| Q. S. T. S. REX —50,000 Tons | Italian Line (now building) |
| S. S. ISHPEMING | Cleveland-Cliffs Iron Co. |
| S. S. HENRY FORD II | Ford Motor Co. |

**Over 800 ships aggregating over 4,000,000 tons have OERTZ RUDDERS.**

*Inquiries Invited*

## OERTZ Rudders,

**75 West St., New York City**

Vol. 60, No. 12, Dec., 1930, issue of MARINE REVIEW, published monthly at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3.00 a year in U. S.; Canada, $4.00; Great Britain, £1; single copies, 35c.

# A HEAT BALANCE

20 years ago, a European Diesel plant, with full utilization of waste heat, developed under test a thermal efficiency of 82%.

## 82% THERMAL EFFICIENCY

Full utilization of waste heat is not practicable for the Diesel-Ship; but waste-heat boilers on foreign motorships are supplying auxiliary power, hot water and heating. A heat balance, prepared by the marine engineer or naval architect, will determine the percentage of the heat units in the fuel which are utilized for ships purposes. Diesel-Ships are utilizing from 50 to 60% of the heat compared with less than 25% for steamships.

# WILL SHOW THE VALUE OF

Underlying the rapid adoption of the Diesel-Ship abroad is the increased utilization of Diesel waste heat for general ships purposes. Occasional reports of as low as .365 lbs. of fuel per shaft horse power for all purposes show the importance of obtaining heat balances for particular ships and particular trades — for steamers — vs — motorships. Until the possibilities of utilization of Diesel waste heat are fully explored, the true comparative value of the motorship will not be revealed.

## DIESEL SHIPS

# BUSCH-SULZER

**BUSCH-SULZER BROS.-DIESEL ENGINE CO.**

**Two Rector St.**
**New York**

**ST. LOUIS, MO.**

**Rialto Bldg.**
**San Francisco**

Experienced marine engineers look to scientific lubrication to keep their engines running smoothly and economically. The Vacuum Oil Company has pioneered in scientific lubrication since 1866. For example, throughout the seven seas—

# 65% of the world's Diesel-driven ships are correctly lubricated with Gargoyle Marine Oils—

**QUALITY BRINGS LEADERSHIP**

SIXTY-FOUR years of specialization have given us a knowledge of how to deal with exacting lubrication needs which is probably unapproached by any other organization in the world.

Our staff of lubrication engineers is continually studying different types of marine engines. When new designs and greater efficiency call for lubrication changes, they recommend the correct oil and its proper application.

Gargoyle Marine Oils are sold in more than 300 of the world's leading ports. In every one of these an experienced Vacuum Oil Company representative is ready at all times to confer with you on your own particular lubricating problems.

NOTE: We will be glad to send you, without obligation, either of our authoritative treatises—"Steamships with Reciprocating Engines" and "Marine Lubrication—Motorships." Address your request to: Vacuum Oil Company, Marine Sales Dept. D-10, 61 Broadway, New York City.

**VACUUM OIL COMPANY**

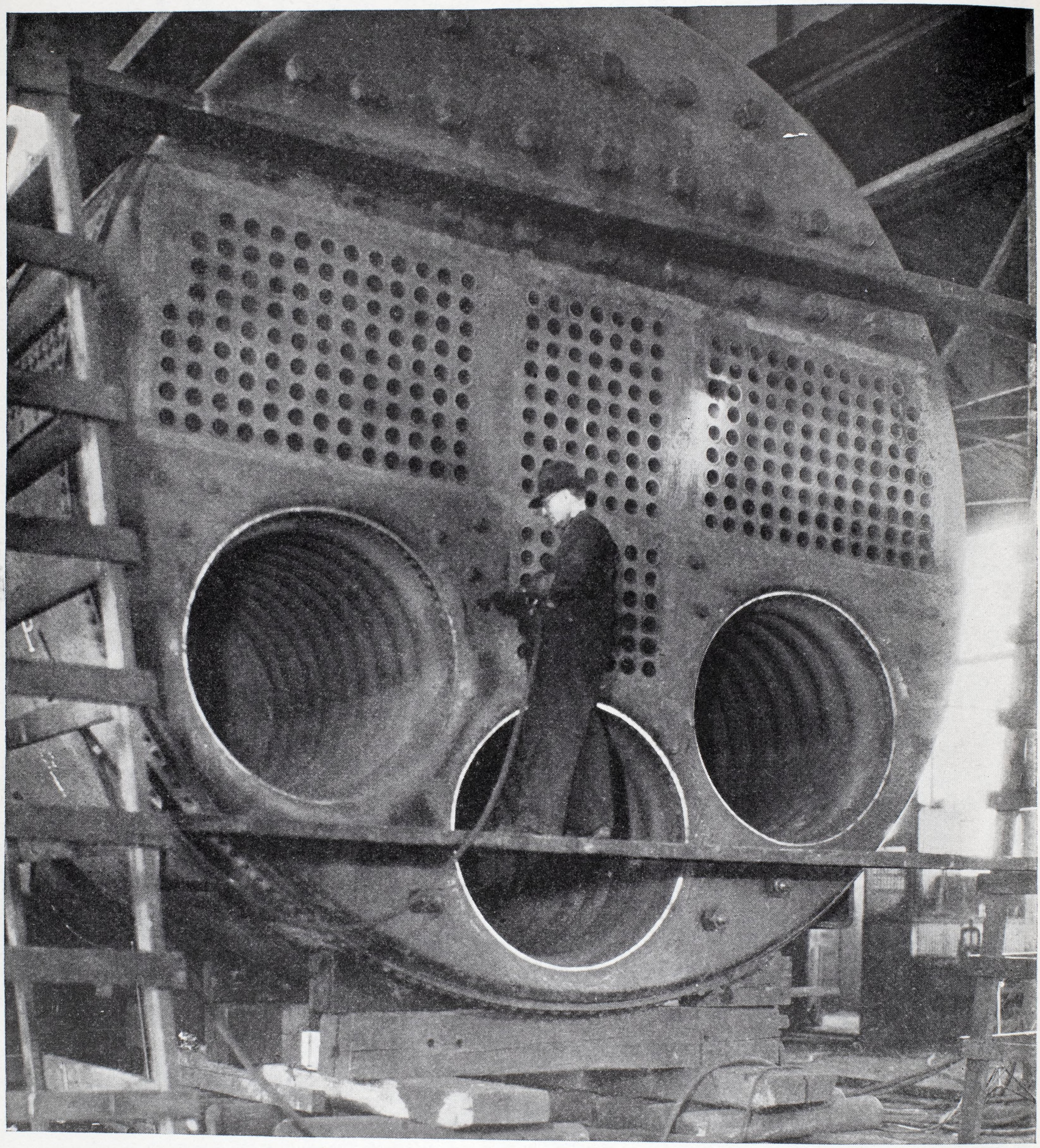
Specialists in the manufacture of high-grade lubricants for every class of machinery. Obtainable everywhere in the world.

GARGOYLE

## Marine Oils

**A grade for every type of service**

# . . . . . NOW IS THE



# The AMERICAN

CLEVELAND
*American Ship Building Co.*

LORAIN
*American Ship Building Co.*

BUFFALO
*Buffalo Dry Dock Company*

# TIME . . *to re-condition and replace old boilers and tank tops*

**MANY vessels running on the Great Lakes are operating with boilers and tank tops that should be replaced.**

**Each year this equipment becomes increasingly expensive to maintain. Its efficiency grows increasingly less. This means more frequent repair delays. And the older such equipment becomes, the greater becomes its danger to human life and property. To continue using it is extravagance—and not thrift.**

**Be thrifty. Don't put off replacing old boilers and tank tops. Avoid expensive losses during the operating season by having American Ship replace them now, in the winter, while your ships are laid up. *Costs are lower this year; labor is more efficient, materials are cheaper.***

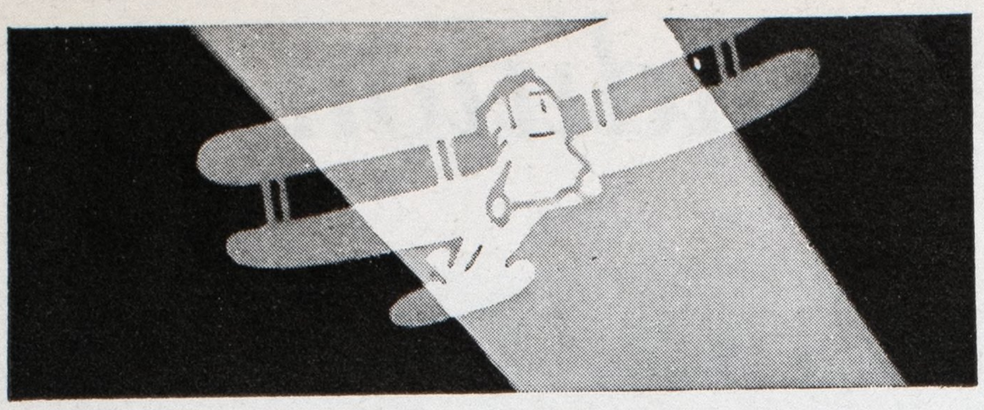
**American's five conveniently located ship yards are equipped to handle any size job—large or small—swiftly, economically, dependably.**

*Building and installing new boilers and tank tops constitute regular American Ship jobs. We re-condition old boilers and repair tank tops too. Vessel owners tell us that they expect a better job from us—and always get it! We* **should** *do a better job if a dependable, trained, experienced organization and unequalled facilities count for anything.*

# SHIP BUILDING Co

SOUTH CHICAGO
*Chicago Ship Building Co.*

SUPERIOR
*Superior Ship-building Co.*

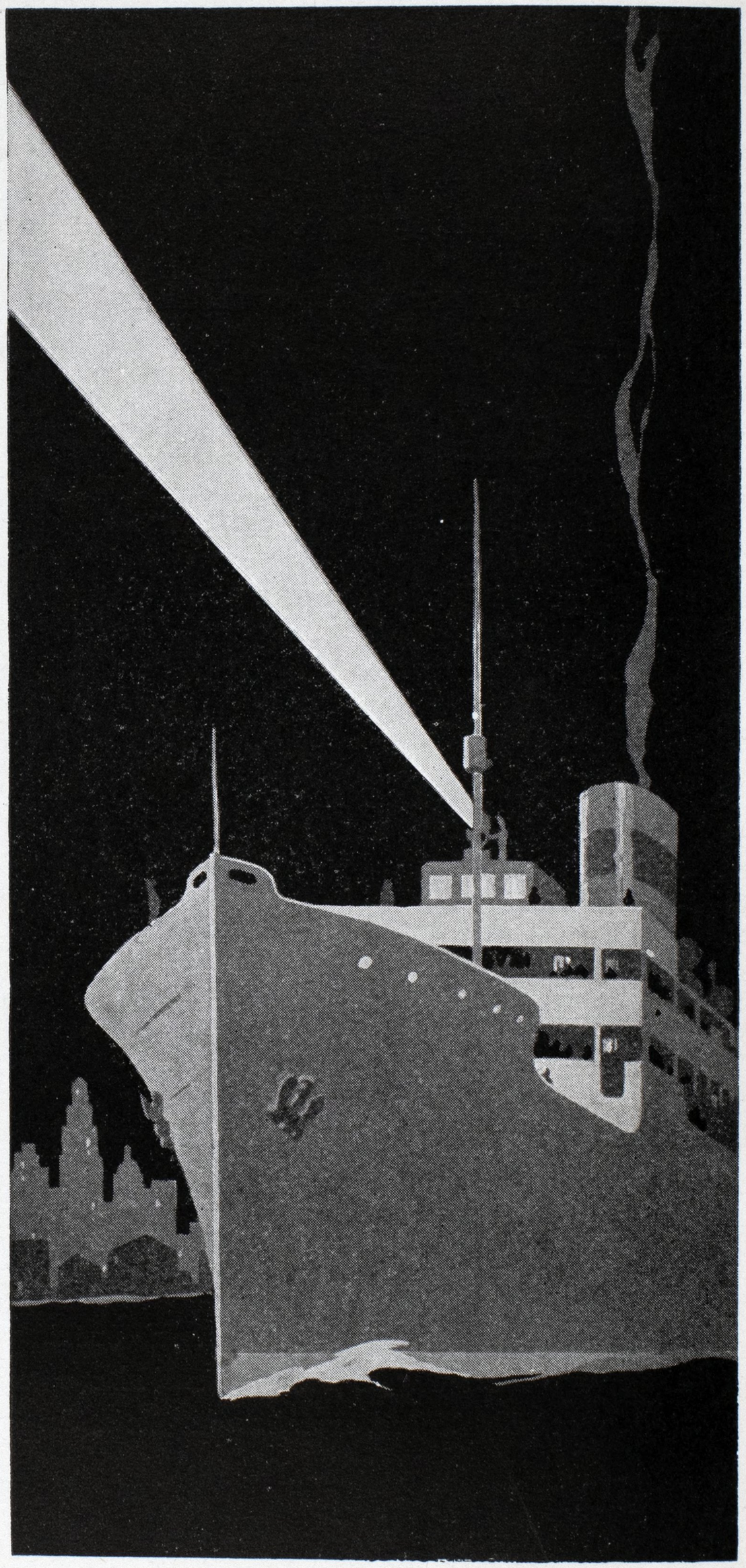


# THE SEARCHLIGHT

LIST the searchlight among the abused and misused accessories on shipboard. Exposed to the elements, carelessly handled, seldom if ever overhauled, it is, nevertheless, expected to perform on short notice as a navigational aid, as a floodlighting unit in critical times at sea, or for the entertainment of the passengers.

Yet searchlights are built to do these many tasks—do them and do them well. G-E marine searchlights are products of the same scientific skill which has created so many marvels of illumination on land. Incandescent and carbon-arc types of correct size and power, and with a method of control precisely suited to the needs of various ships, are available to discriminating operators.

The unsurpassed experience and facilities of General Electric are ever at the disposal of ship builders and ship owners who, by means of electrification, would keep in step with maritime progress.

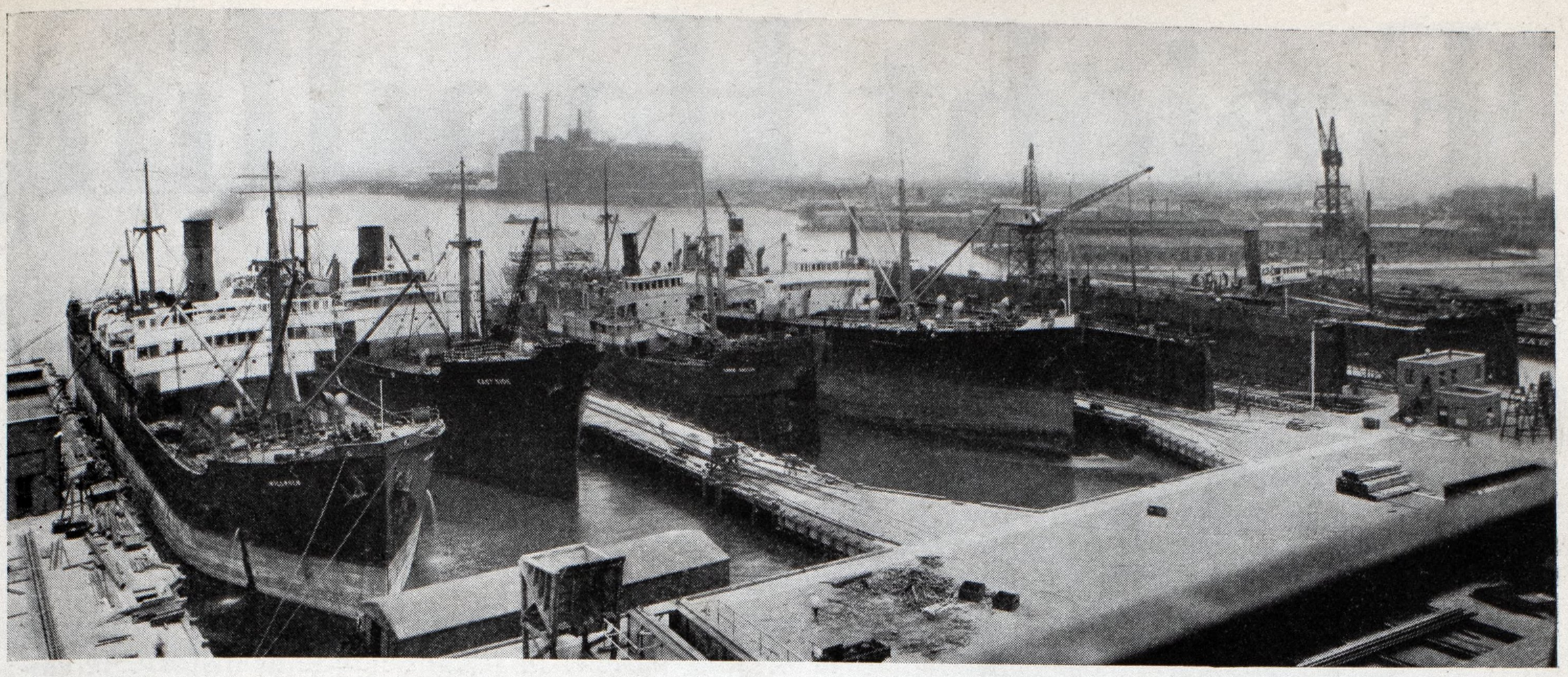


711-43

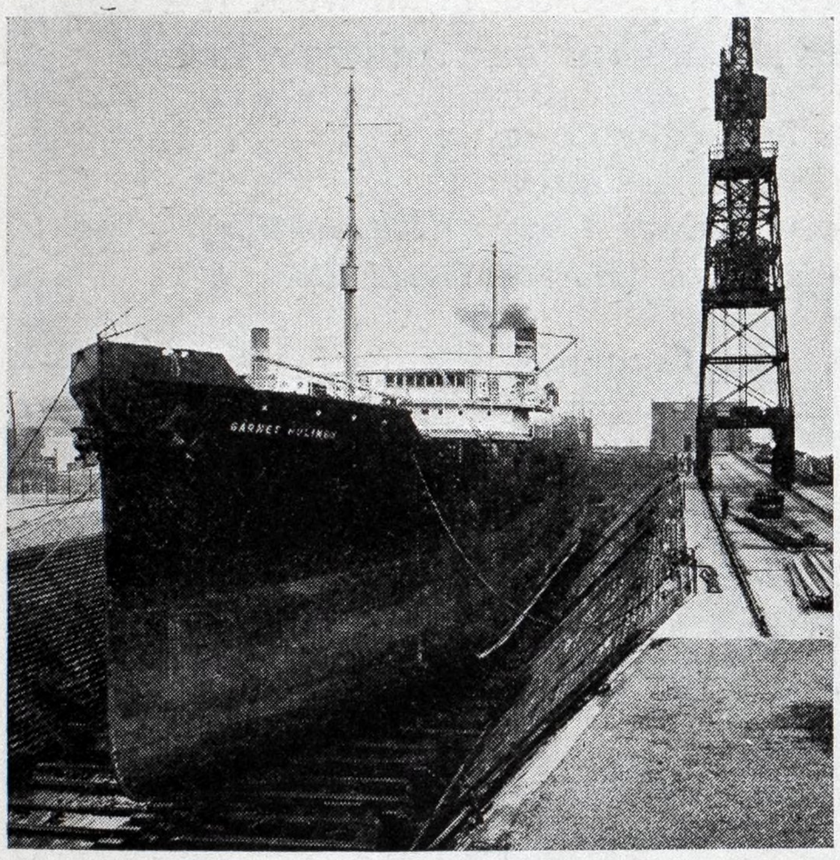
JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

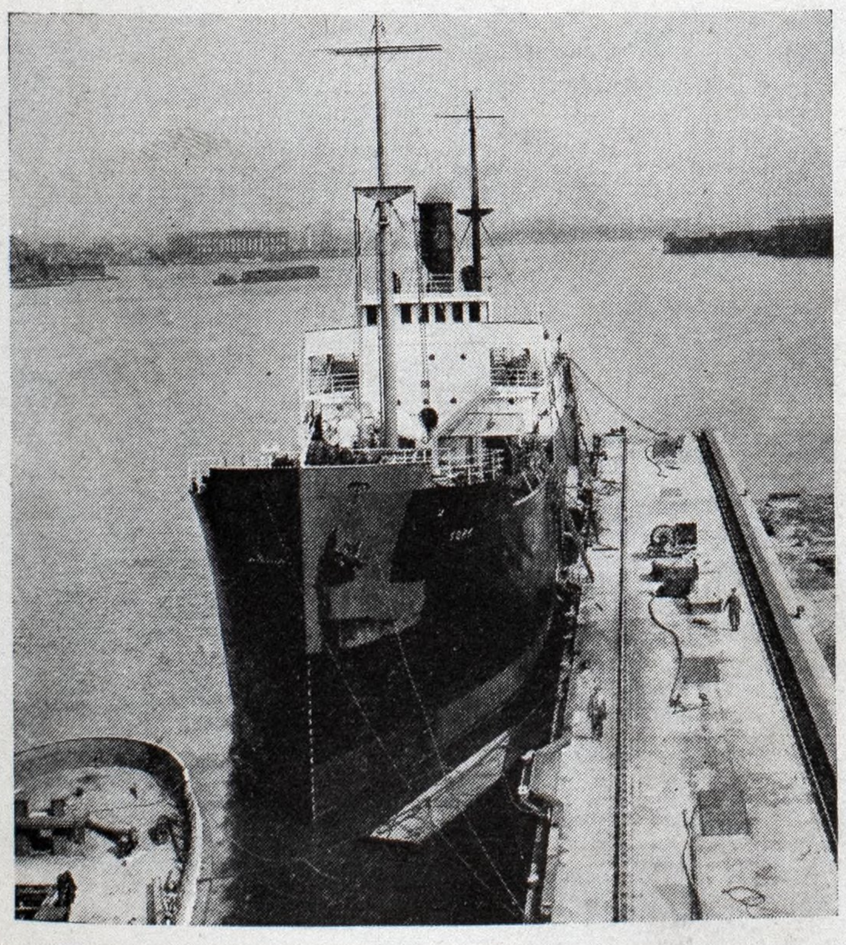
GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES



# PROMPT AND ECONOMICAL SHIP REPAIRS AT BALTIMORE





**Bethlehem's Ship Repair Plants at the Port of Baltimore are completely equipped with modern drydocks, shops and foundries. They are in an excellent position to promptly repair or recondition all classes of vessels and floating equipment.**

**Bethlehem's Dry Docks at this Port include three floating drydocks of 20,000, 10,000 and 6,000 tons capacity respectively, and two graving docks, one 614 feet long and the other 469 feet long.**

**Ample supplies of materials are carried in stock for rush and general service.**

**Telephones**
**Day Calls . . . . . South 1000**
**Night Calls . . . . . South 1593**

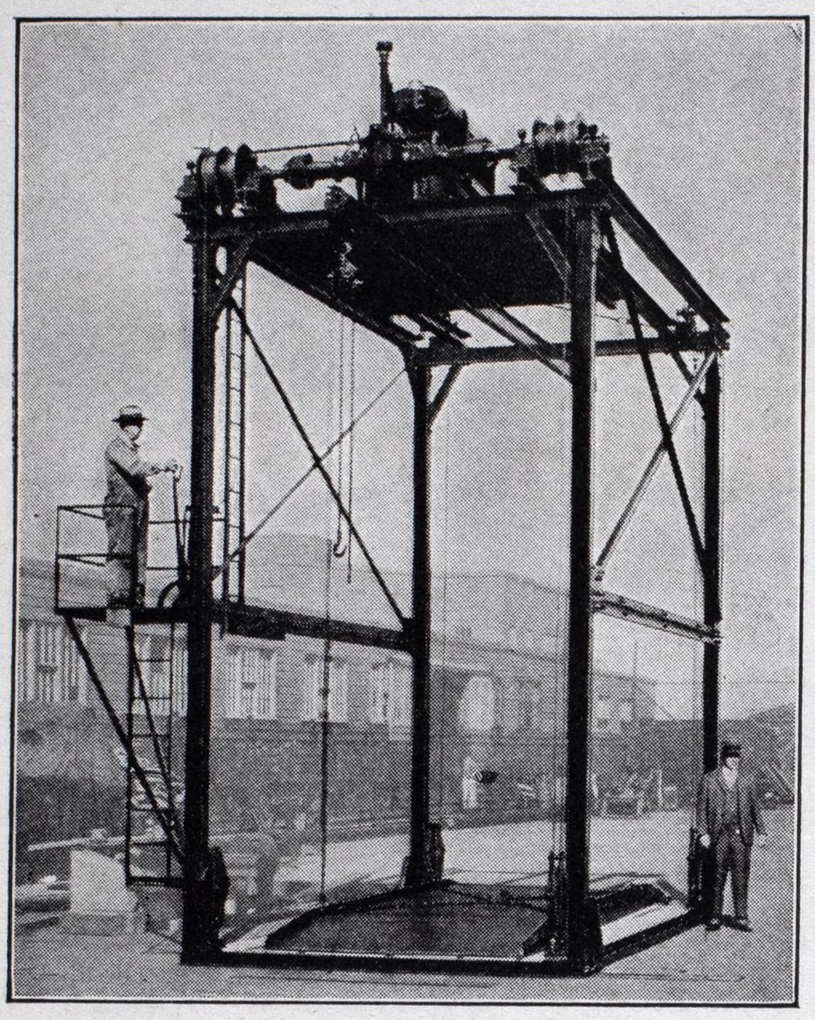
**BETHLEHEM SHIPBUILDING CORPORATION, Ltd.**
**Bethlehem, Pa.**

***GENERAL SALES OFFICES***

**NEW YORK: 25 BROADWAY—SAN FRANCISCO: 20th & ILLINOIS STS.**
**District Offices in Boston, Baltimore and San Pedro**

# BETHLEHEM

# Freight Handling *Now you can*



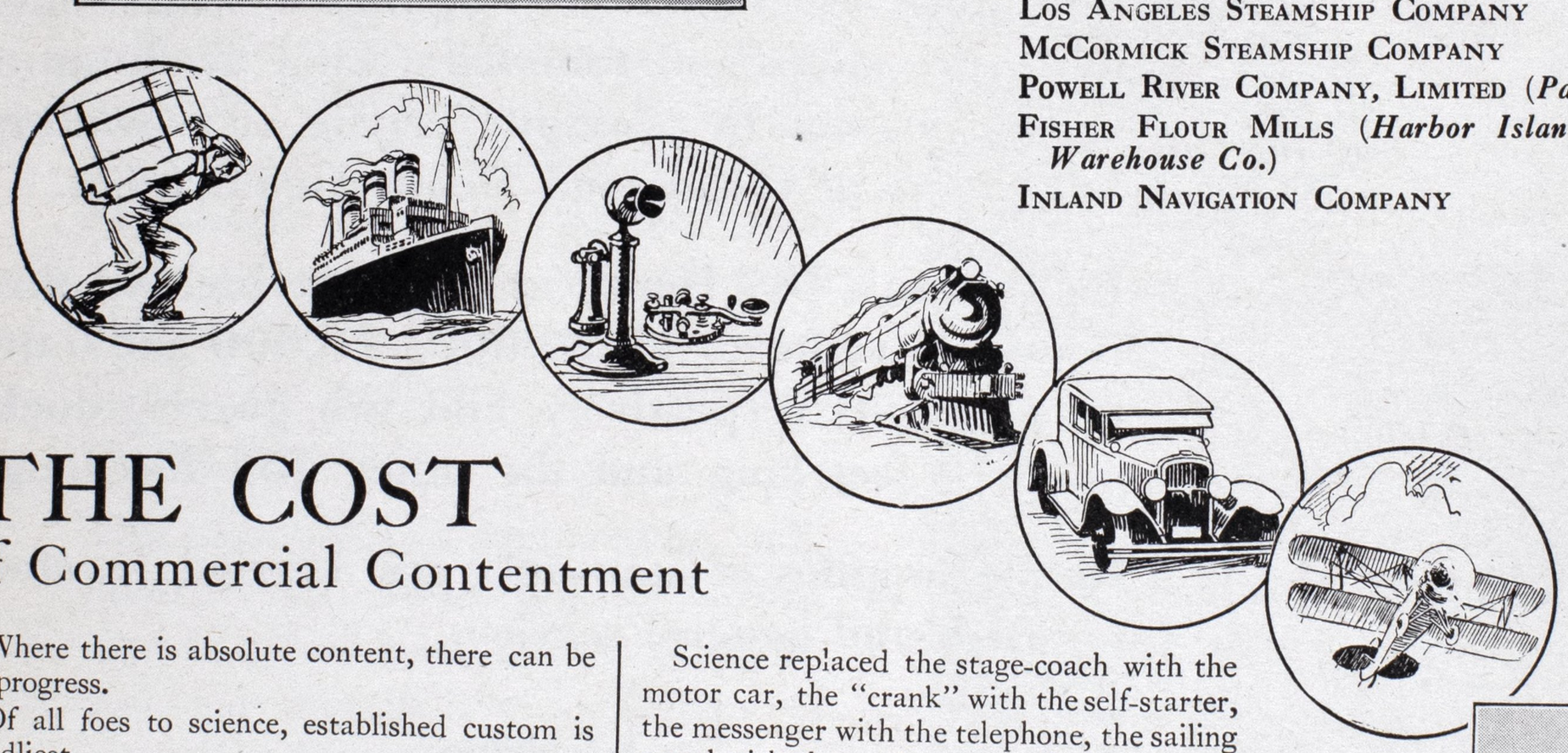
***LIDGERWOOD brings to Steamship and Railway Lines the good Barlow Marine Elevator***

THE unfailing success of the Barlow Marine Elevator is without parallel in freight handling history. It embodies all that modern science and precision workmanship can give.

You have a right to expect much from this new and better method; it is backed with thirty years of practical freight handling experience.

Know the full meaning of freight handling economy; see for yourself, in your own office, how the Barlow Marine Elevator performs; see the good work it is doing for these and other steamship and railway lines:

LOS ANGELES STEAMSHIP COMPANY
McCORMICK STEAMSHIP COMPANY
POWELL RIVER COMPANY, LIMITED (*Paper Mills*)
FISHER FLOUR MILLS (*Harbor Island Dock & Warehouse Co.*)
INLAND NAVIGATION COMPANY



## THE COST
### of Commercial Contentment

Where there is absolute content, there can be no progress.

Of all foes to science, established custom is deadliest.

"Good Enough" has been no improver; it did not love the modern steamship, the purr of the telephone, nor the click of the telegraph.

* * *

Now science has penetrated into the established order of freight handling on docks and steamships, and has overcome the inertia of — "let well enough alone."

Science has no tolerance with mere appearance or general impression; it substitutes *facts* for one and *demonstration* for the other.

Science deals in nothing but facts, and has but one rule; it loses no advantage—when once gained.

Science replaced the stage-coach with the motor car, the "crank" with the self-starter, the messenger with the telephone, the sailing vessel with the modern ocean liner.

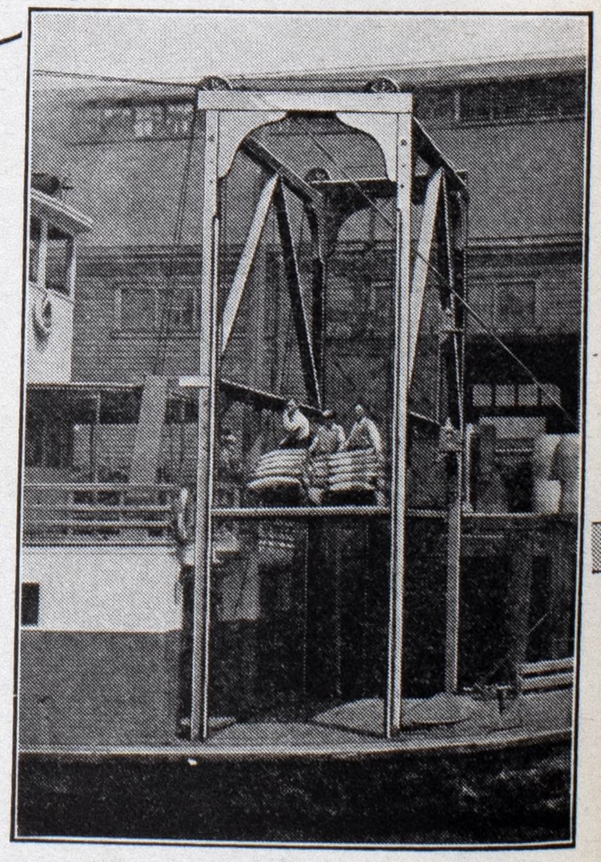
And Science has more recently demonstrated that on docks and steamships it is NOW possible for one man with a Barlow Marine Elevator to do the work of ten.

Science has decreed that the steamship and barge operators, the railroads and the dock owners of the world are now entitled to the full benefits of the Barlow Marine Elevator!

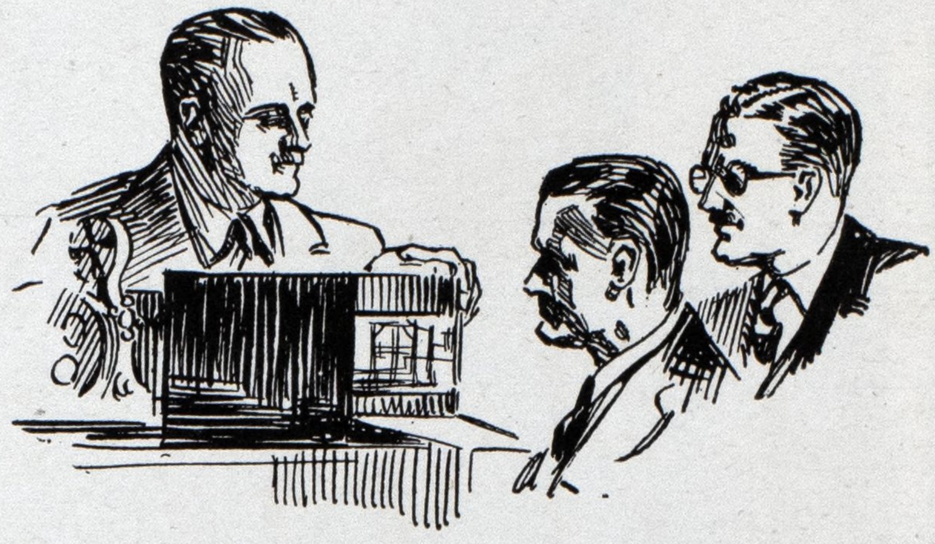
Science has proved that when a new method can be worth a hundred thousand dollars a year to a steamship or railway, the *absence* of that method is equivalent to a hundred thousand dollar tax.

***Science marshalled in the railroad, the steamship, the telephone, the telegraph, the motor car, the airplane and the Barlow Marine Elevator!***

***—and now comes the Barlow Marine Elevator***



# at Lower Cost
## *quickly increase profits!*



Permit Captain Harry Barlow to bring this compact, convenient moving picture camera to your office; then you will see how the Barlow Marine Elevator performs in actual use, just as plainly as if you personally were on the docks in Seattle, Portland, San Francisco, New York, Cincinnati, New Orleans.

Now there are instances where, with a Barlow Marine Elevator, one man can do with speed and ease, the hard, slow, burdensome work that formerly required ten men.

Captain Barlow has been a vessel owner, and has been identified with freight handling problems for over thirty years. First, he installed the Barlow Marine Elevator on his own vessel, and, as a result of splendid performance, it quickly won the confidence of leaders in American transportation.

Without cost or obligation, may we demonstrate the facts—for your consideration?

***In the East:***

LIDGERWOOD MANUFACTURING COMPANY

*Marine Division*

ELIZABETH, NEW JERSEY ~ 96 LIBERTY STREET, NEW YORK

❖ ❖ ❖

***In the West:*** ***The Colby Steel & Engineering Co., Seattle, Wash.***

***Among many other users we also number these:***

NORTHERN PACIFIC RAILWAY
UNION PACIFIC RAILWAY
BAY CITIES TRANSPORTATION COMPANY
OCEANIC TERMINALS
CANADIAN PACIFIC RAILWAY
BERKLEY TRANSPORTATION COMPANY
PACIFIC STEAMSHIP COMPANY
(*British Columbia Coast Steamship Service*)

**LIDGERWOOD**

**..TO-DAY..**
**SEND FOR**
**...THIS...**
**INSTRUCTIVE**
**...BOOK...**

LIDGERWOOD MFG. CO.,
ELIZABETH, NEW JERSEY.

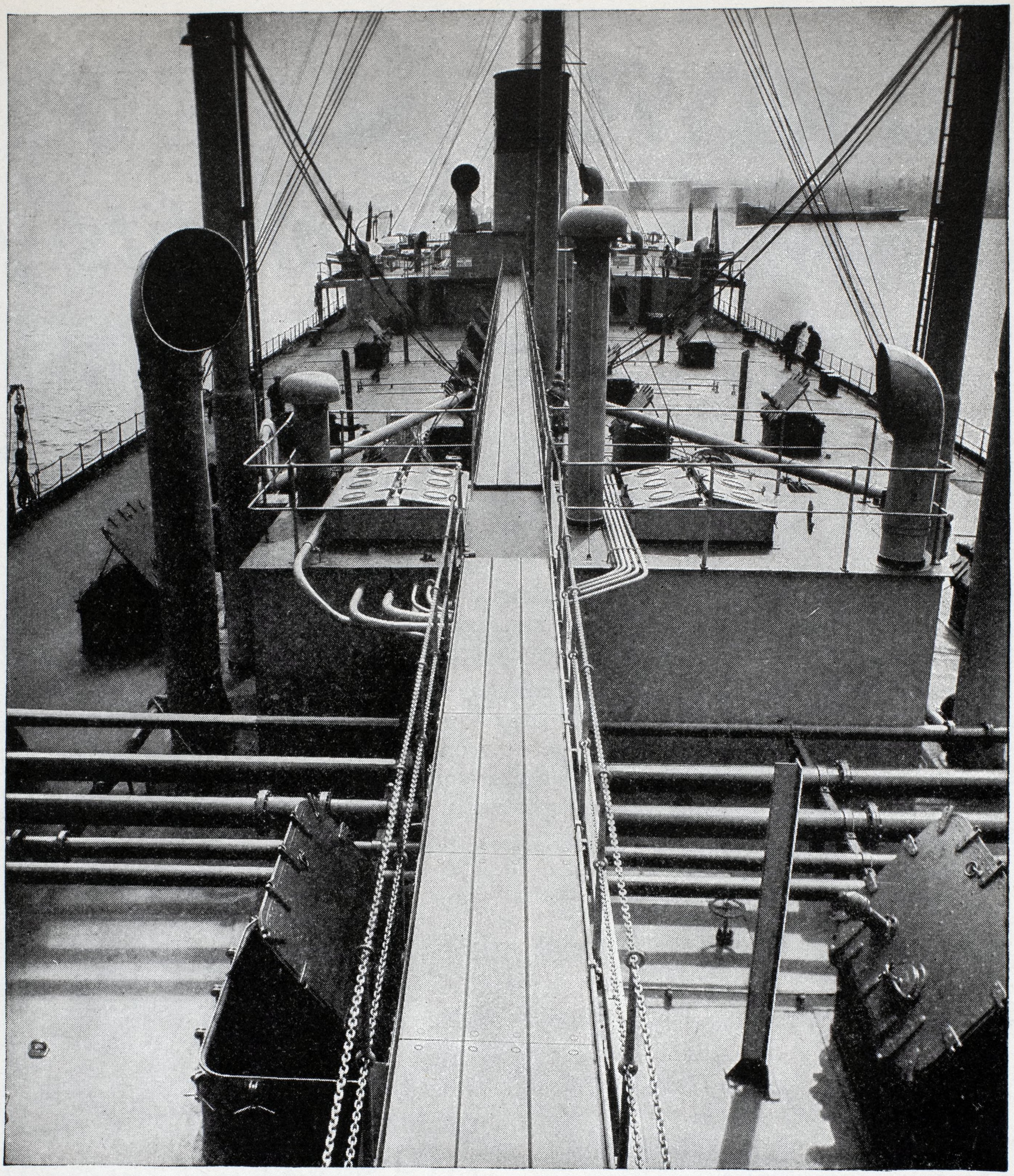
Please send book "FREIGHT HANDLING AT LOWER COST."

NAME_____

STREET_____

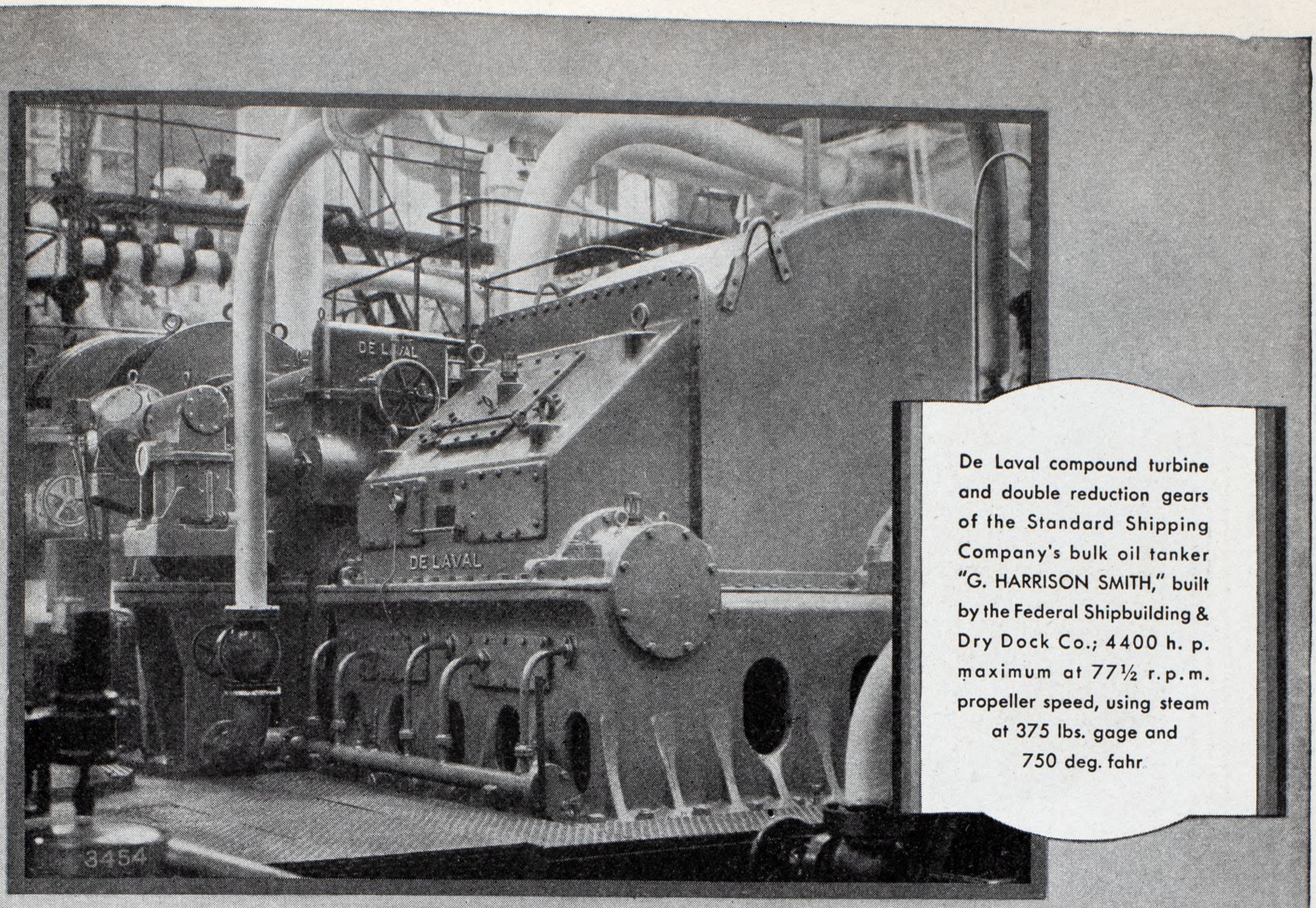
CITY_____ STATE_____

FEDERAL BUILDS GOOD SHIPS



# TANKERS ...more than other ships, are dependent for success on the quality of workmanship built into their steel hulls...Strains from deep loading and from operating in ballast impose unusual requirements on the steel structure...Experience in designing and satisfactorily meeting the exacting requirements of some of the largest oil companies, enables Federal to offer tankers built with the one ideal in mind...STEEL WORKMANSHIP OF SUPERIOR QUALITY.

**FEDERAL SHIPBUILDING AND DRY DOCK COMPANY**
**GENERAL OFFICES AND WORKS: LINCOLN HIGHWAY, KEARNY, NEW JERSEY**
**SUBSIDIARY OF UNITED STATES STEEL CORPORATION**



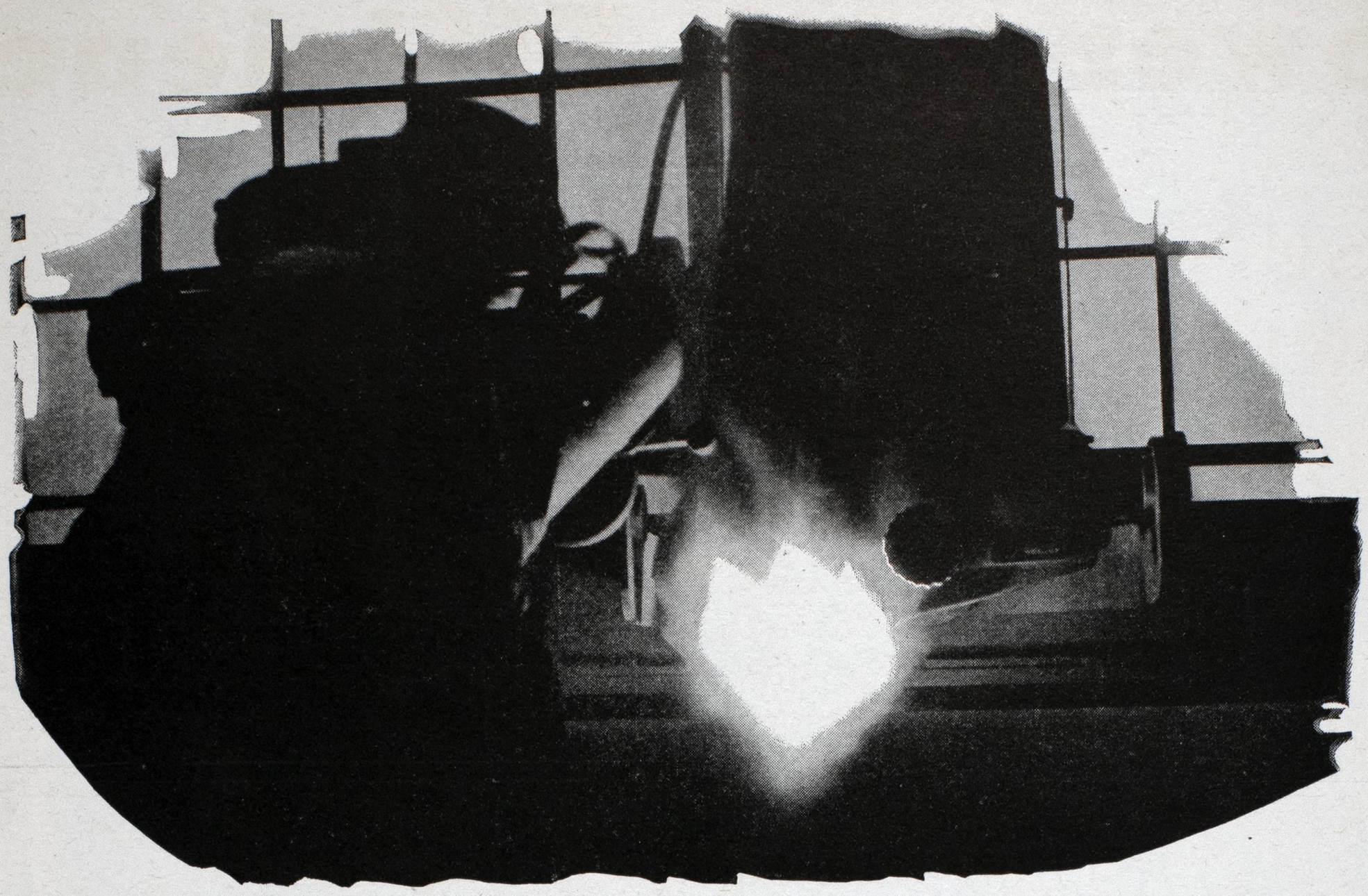

De Laval compound turbine and double reduction gears of the Standard Shipping Company's bulk oil tanker "G. HARRISON SMITH," built by the Federal Shipbuilding & Dry Dock Co.; 4400 h. p. maximum at 77½ r.p.m. propeller speed, using steam at 375 lbs. gage and 750 deg. fahr.

# LOW COST, RELIABLE POWER *from* DE LAVAL GEARED TURBINES

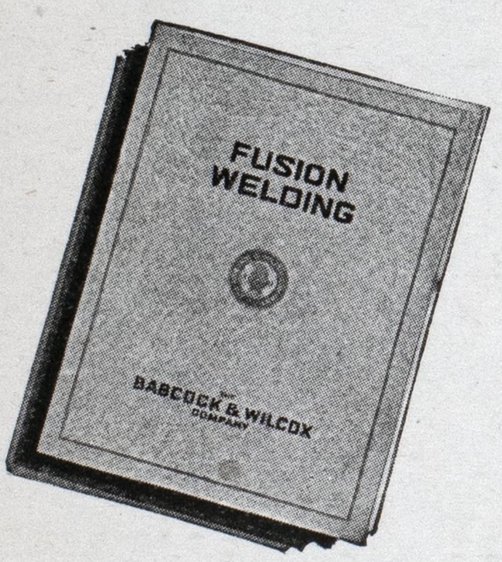
**De Laval compound turbines and double reduction gears have been selected for the propulsion of modern bulk oil carriers because of their**

**1—Reliability**
**2—Lower fuel cost (bbl. per trip and dollars per bl.)**
**3—Relatively low first cost, as compared with other methods of propulsion**
**4—Relatively low weight and small amount of space occupied**
**5—Great maneuvering ability.**

**De Laval Steam Turbine Co., Trenton, N. J.**



# Babcock & Wilcox
# Welded Boiler Drums
# For New Scout Cruisers




***Fusion Welding*** is the title of a booklet issued by The Babcock & Wilcox Company describing this new technique. Copies will be furnished upon request.

## First approval of Welded Boiler Drums given by Bureau of Engineering, U. S. Navy, with order for twenty-four boilers

After several years of independent research work, The Babcock & Wilcox Company has developed a new fusion welding technique which consistently produces welds equal to or better than the plate metal in tensile strength, shock resistance, ductility, and ability to withstand repeated stresses.

The nature of this process assures sound welds, but as an additional guaranty the company proves the soundness of welded seams in finished products through the use of X-Ray examinations and other non-destructive tests.

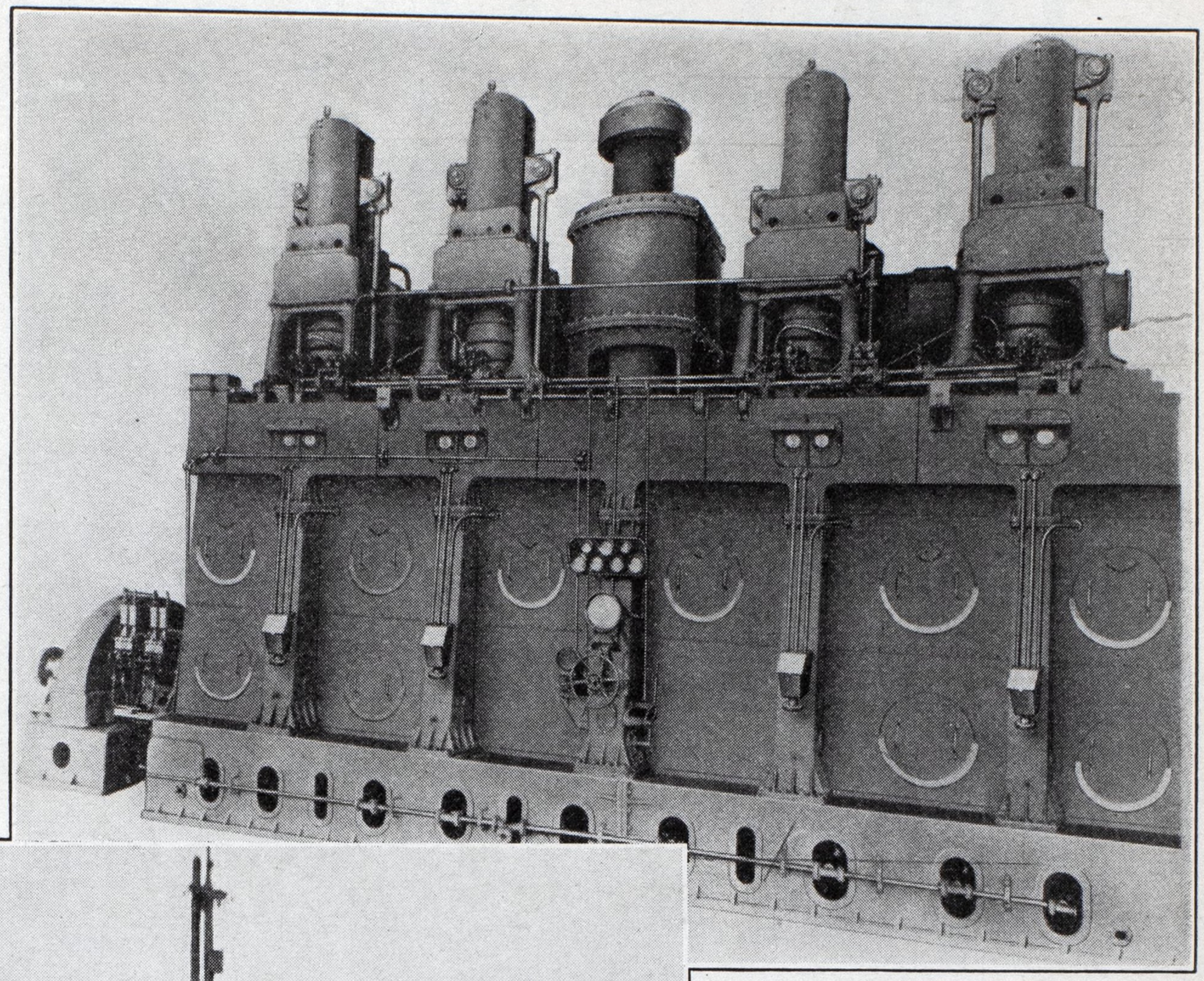
The Bureau of Engineering, United States Navy, has approved the use of this technique in fabricating the drums of twenty-four boilers now being constructed by The Babcock & Wilcox Company for the new scout cruisers, Minneapolis, New Orleans, and Astoria. This is the first time the Bureau has approved fusion welded drums in boiler construction. In fact it is the first authoritative approval of fusion welded high pressure boiler drums in the United States.

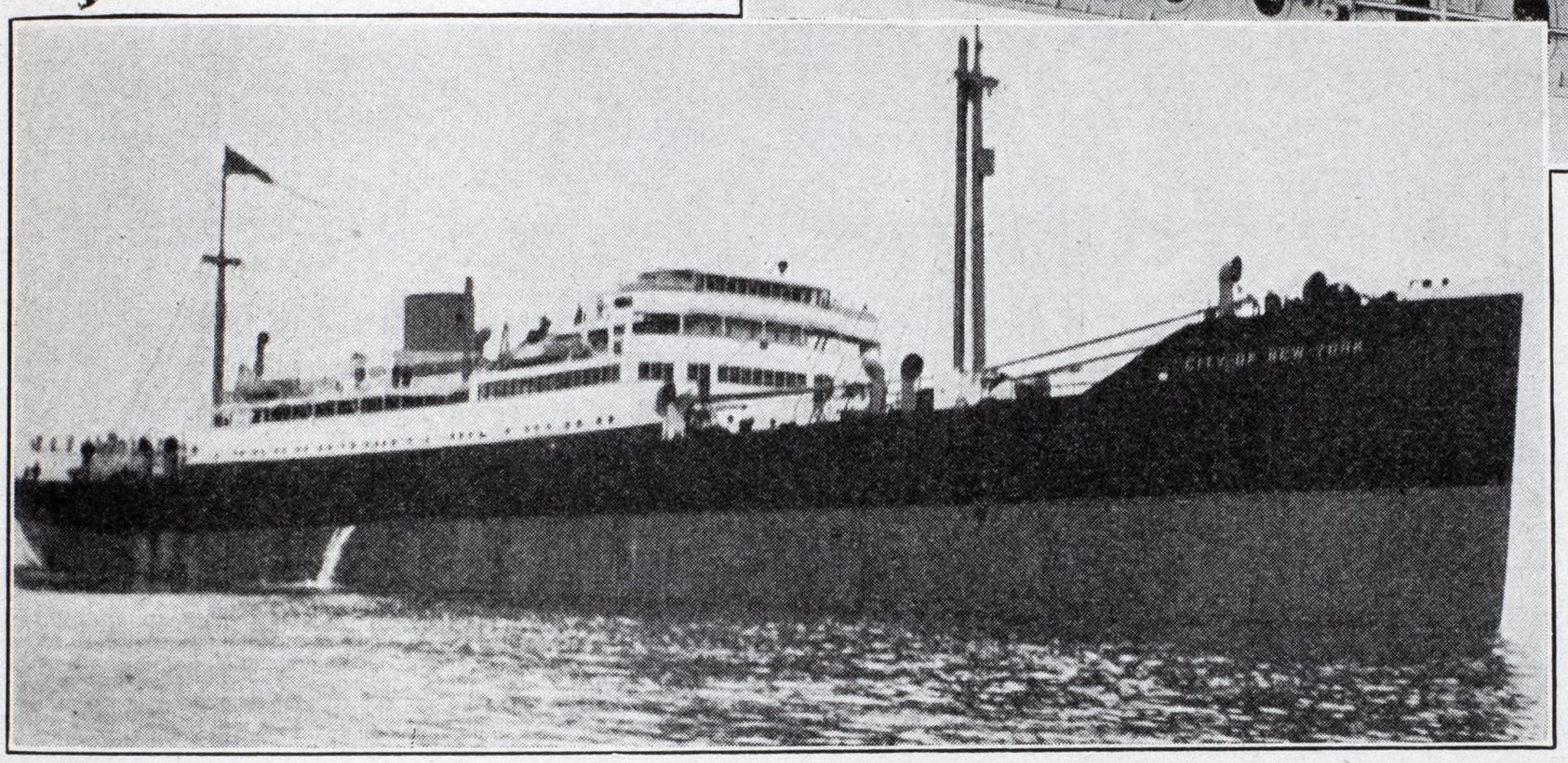
**THE**
# BABCOCK & WILCOX
**85 LIBERTY ST. COMPANY NEW YORK, N. Y.**

M-22

# Power with Efficiency

## SUN-DOXFORD Opposed-Piston DIESEL ENGINES





*The Ms. City of New York, first big combination freight and passenger motorship built in America, is owned by the American South African Line. Her length is 470 ft. 8 in., deadweight capacity 9350 tons, first class passenger accommodation 60, power 5400 s.h.p. and speed 14 knots*

*Builders of*

## Passenger and Cargo Vessels—Oil Tankers

*Unlimited facilities for*

## MARINE REPAIRS

*Two floating Dry Docks*

*11,000 Tons Lifting Capacity Each*

DRYDOCKING AND REPAIRS

BUILDERS OF ALL TYPES OF VESSELS

# SUN SHIPBUILDING & DRY DOCK COMPANY

Shipyard & Main Office
CHESTER, PA.

25 Broadway
NEW YORK

# Today's Pressure . . .
## *Makes Tomorrow's Fortunes*

**Any period of readjustment is a period of pressure. Demand bears down; supply shoulders upward; competition jams closer. Industries jostle and crowd as they turn about to face new circumstances, changed conditions. Readjustment means *compression*.**

**And pressure brings out *winners*. Today's pressure is fusing the elements of tomorrow's successes. It is crystallizing the small beginnings of tomorrow's fortunes. As you read these words, the pressure of today's readjustment is creating leaders for tomorrow's prosperity. Will you be one of them?**

**Then watch your business paper. Now is the time to follow it closely for news of significant developments. Its editors survey the *whole* field of your operations. They gather for you a thousand bits of information that would not ordinarily come your way. And any one of those grains of fact *may* be the vital element that will send *your* business shooting out of the pressure into leadership.**

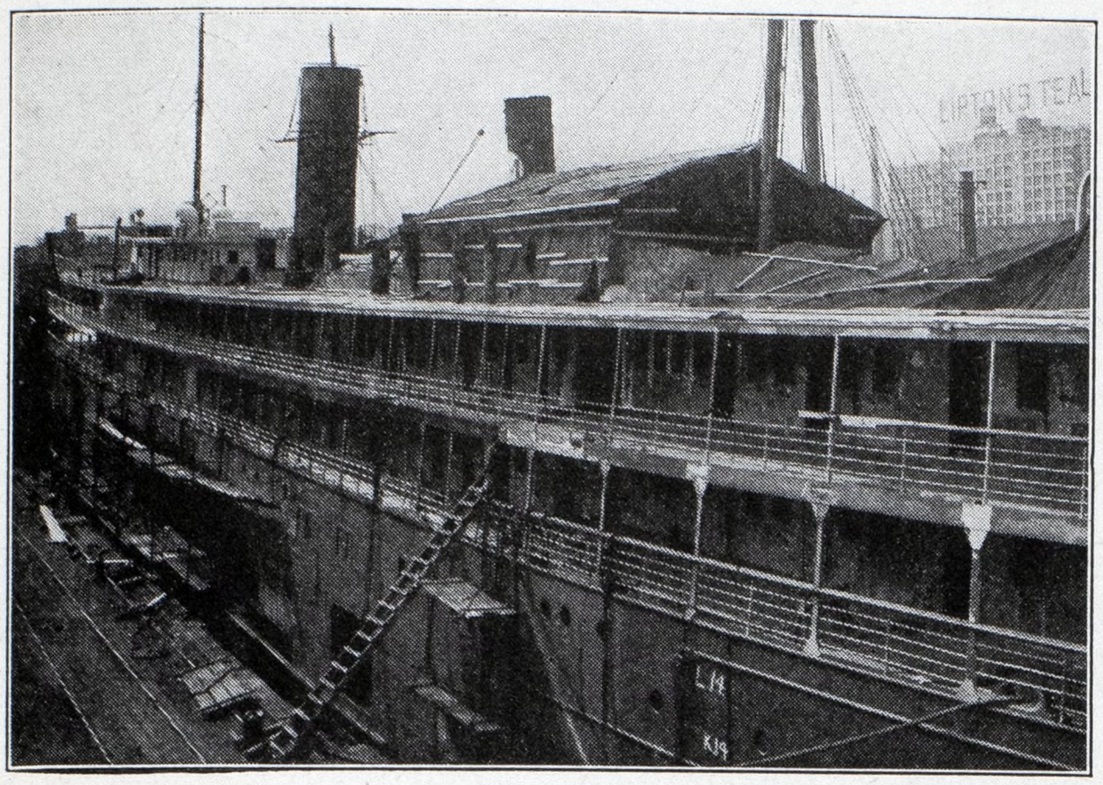

THIS SYMBOL *identifies an ABP paper . . . It stands for honest, known, paid circulation; straightforward business methods, and editorial standards that insure reader interest . . . These are the factors that make a valuable advertising medium.*

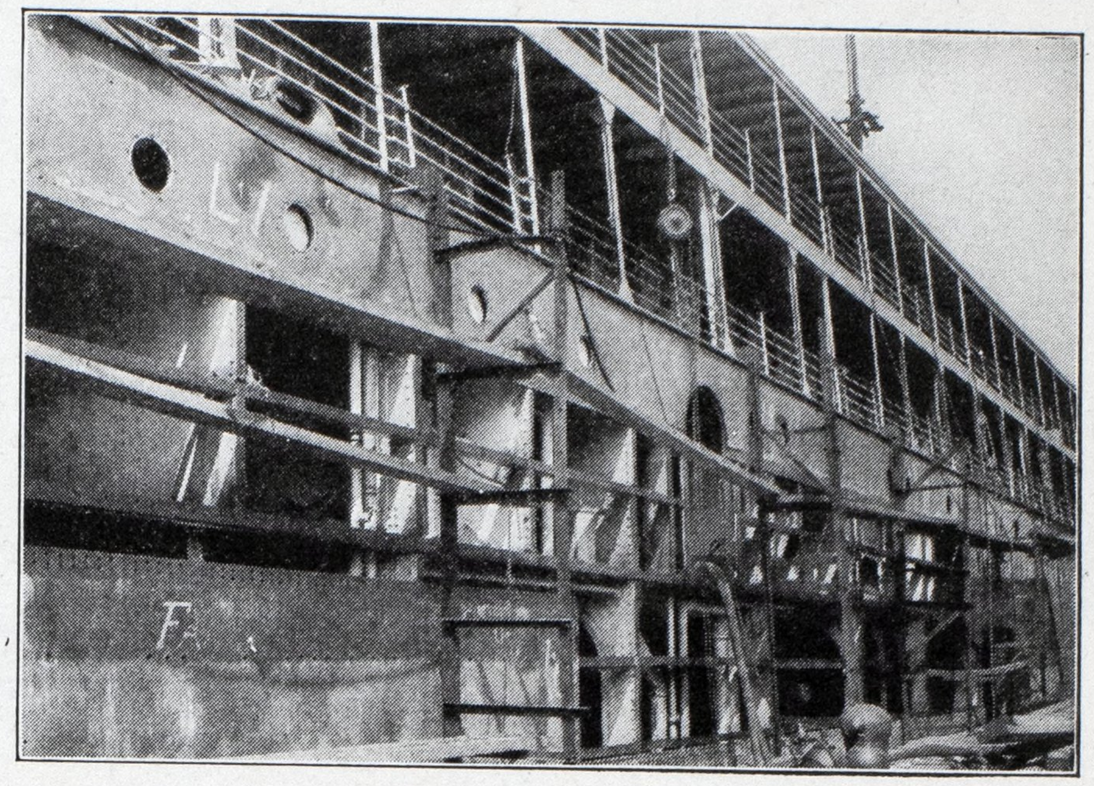
*MARINE REVIEW is a Member of*

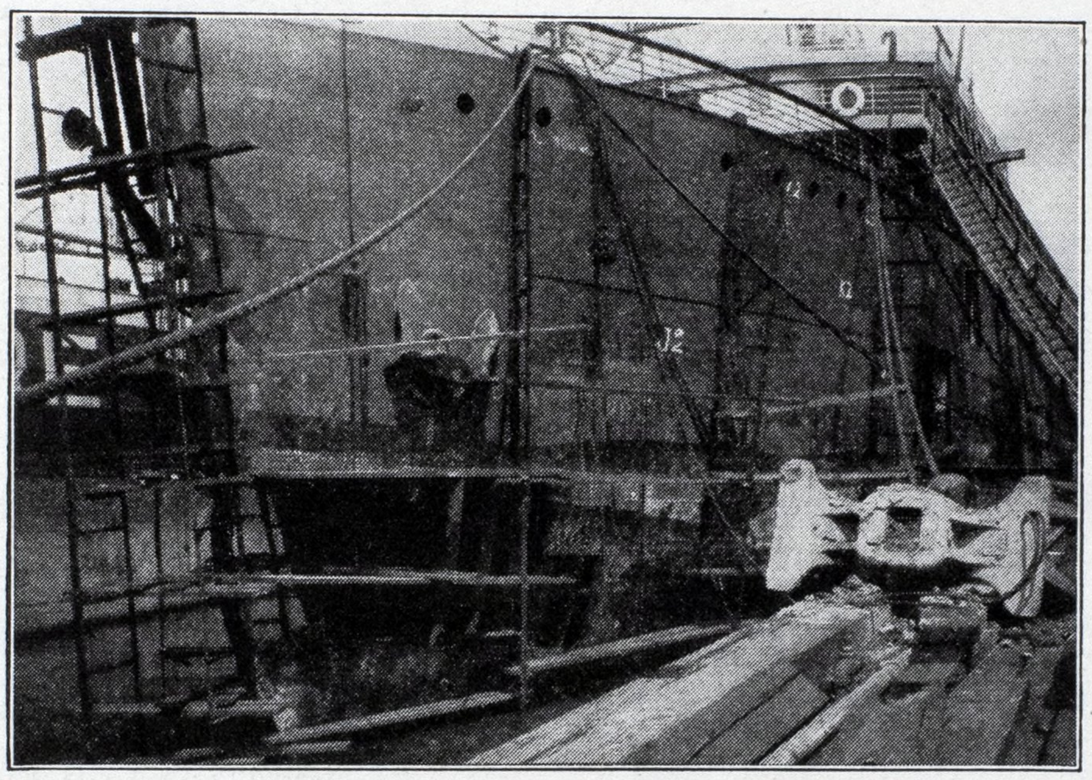
THE ASSOCIATED BUSINESS PAPERS, INC.

TWO-NINETY-FIVE MADISON AVENUE - NEW YORK CITY

# *Four "Earning Days" Saved for the S. S. Fairfax*





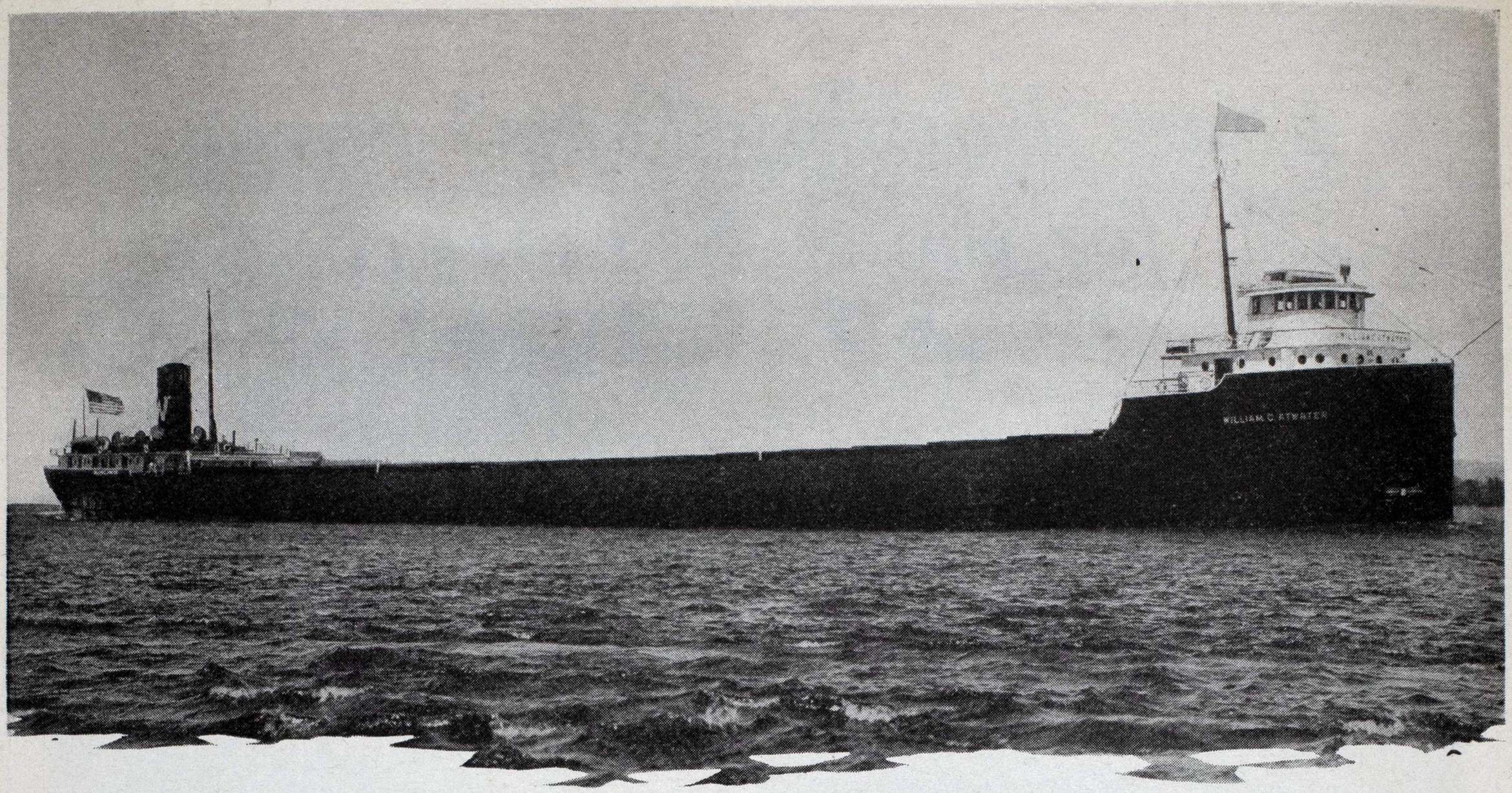


WHEN United agreed to recondition the Merchants and Miners liner *Fairfax* in 45 days it expressed also its determination to better the contract time if possible. Keeping in mind that a ship earns no money in a repair yard, United exerted every effort to save time. As a result, the *Fairfax* was returned to her owners four days ahead of schedule. Those four days became earning days, for they enabled the *Fairfax* to make a voyage that had not been counted on. It is noteworthy also that United's bid was 15 days under the next low bid. But that is the sort of service that is standard at the Fletcher Plant—where the *Fairfax* was repaired—and at United's four other plants—Crane, Morse, Shewan and Staten Island. The reason for this policy of superior service is obvious—the best customer is a satisfied customer.

# UNITED DRY DOCKS

Incorporated

11 Broadway DIGby 0500 New York




# ____AGAIN A LEADER!_____

FOR THE FIFTH CONSECUTIVE YEAR A WILSON TRANSIT CO. STEAMER BUILT BY GREAT LAKES ENGINEERING WORKS HAS CARRIED THE GREATEST AMOUNT OF FREIGHT THROUGH THE CANAL AT SAULT STE. MARIE

Following are the records since 1925 in which year the total freight carried by a steamer exceeded 550,000 tons for the first time:

| | | | |
|---|---|---|---|
| 1925 ..... | James MacNaughton ..... | 554,100 | Net Tons |
| 1926 ..... | Wm. C. Atwater ..... | 442,107 | ,, ,, |
| 1927 ..... | James MacNaughton ..... | 554,978 | ,, ,, |
| 1928 ..... | Wm. C. Atwater ..... | 487,888 | ,, ,, |
| 1929 ..... | Wm. C. Atwater ..... | 557,020 | ,, ,, |

## GREAT LAKES ENGINEERING WORKS

Shipbuilders and Engineers

General Offices

River Rouge, Michigan

Cleveland Office: Union Trust Bldg.

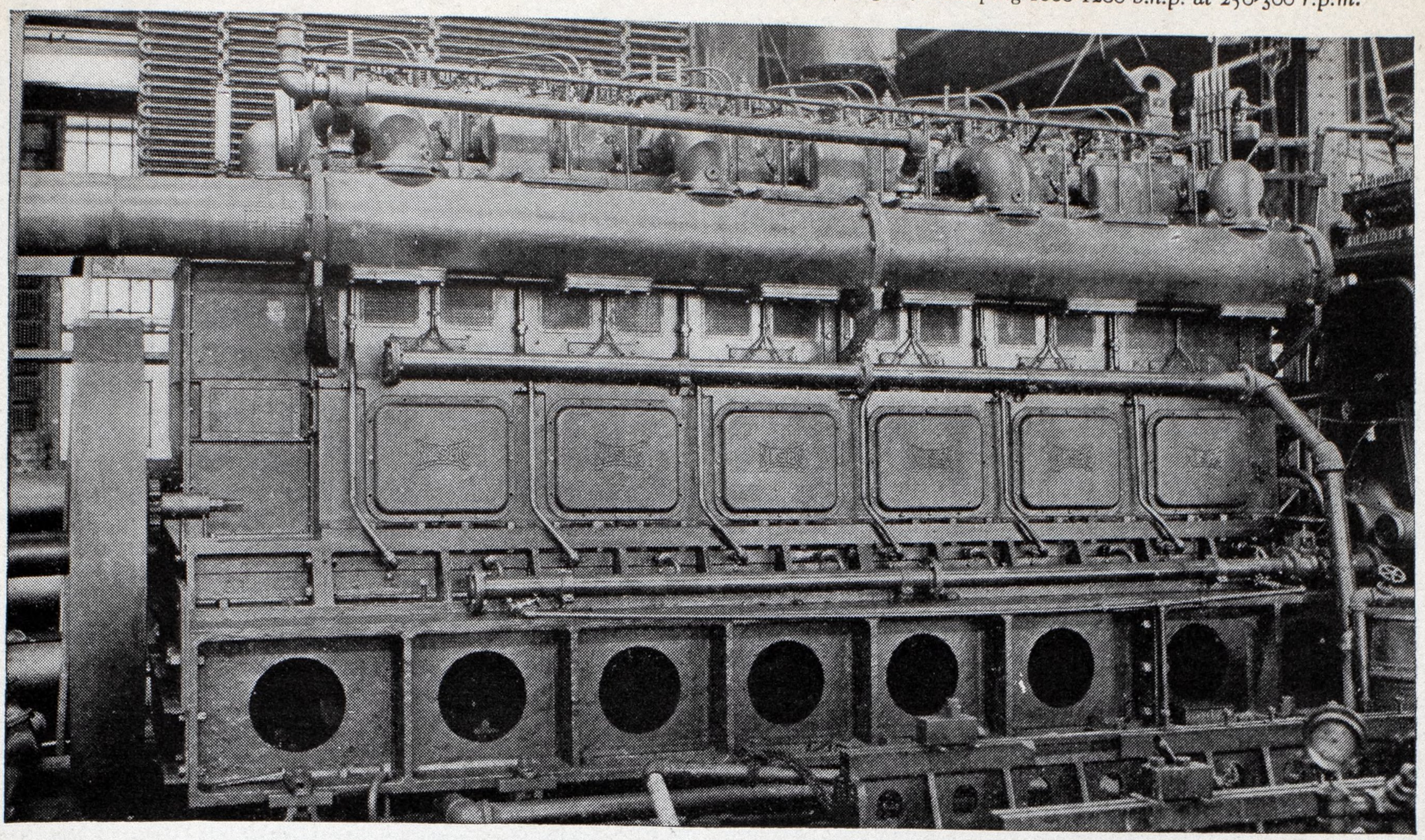
*Engine Works Equipped For General Heavy Machine and Foundry Work*

*Detroit, Michigan*

*Complete Shipbuilding Dry Dock and Repair Facilities*

*River Rouge, Mich., and Ashtabula, Ohio*

*Type 6 MI-53, 6-cylinder, 4-cycle, mechanical injection Nelseco Marine Diesel Engine, developing 1000-1200 b.h.p. at 250-300 r.p.m.*



# Nelseco announces a new 1200 h. p. Diesel

AFTER satisfactory completion of continuous and very severe shop tests which have extended over a period of nine months, Nelseco is prepared to make deliveries of a newly designed 1200 h.p. Diesel which has been developed for use in Diesel-electric installations.

The moderate weight and compact design of this new Nelseco model enable it to be used in connection with electric drive at the sacrifice of no more space than is required by large slow-speed direct-connected engines. Furthermore, the first cost of such a Diesel-electric installation is practically no greater, even though the electrical apparatus is included.

**Advantages of Diesel-electric over direct drive are well known, a few of which are: Greater reliability at sea; less time lost in port, as repairs may be made at sea without appreciably affecting ship's speed; most efficient propeller speed may be selected; instant pilot-house control; use of one main engine for carrying auxiliary loads in port; saving of cargo space due to elimination of shaft alley.**

Type 6 MI-53, 6-cylinder, 4-cycle, mechanical injection Nelseco Marine Diesel Engine, developing 1000-1200 b.h.p. at 250-300 r.p.m., incorporates the soundest and most modern principles of design which have been developed by an organization outstanding in its field for many years. It will be found flexible and reliable in performance, and economical both in first cost and in operation. We shall be glad to send you complete information about this or any other model. (The range of Nelseco Diesel Engines includes types for tow-boats, yachts, passenger, freight and fishing vessels of all descriptions.) Write for Catalog M-12.

ELECTRIC BOAT COMPANY

NEW LONDON SHIP AND ENGINE WORKS, GROTON, CONN., U. S. A.

*New York Sales Office:* 247 Park Avenue, New York City

# NELSECO

Original licensees from and collaborators with M. A. N. since 1910

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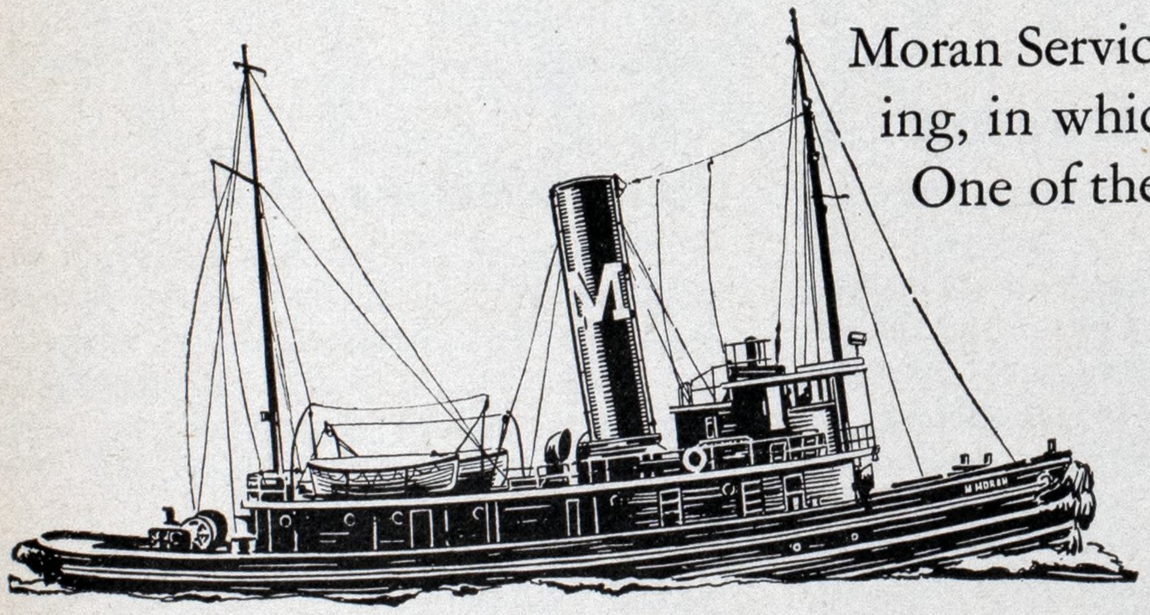
# *Sixty-nine* Years of increasing Growth *prove the* DEPENDABILITY *of* MORAN SERVICE

MORAN Service could not possibly have developed so remarkably in sixty-nine years if its dependability had not won the confidence of its clients and of the admiralty, underwriters' surveyors, insurance and governmental agencies whose purpose is the commercial marine welfare of the Port of New York. Twenty-four hours a day, day in and day out, Moran Service never varies that quality of unfailing dependability, maintained through three generations of Moran ownership. Its wide range of unexcelled floating equipment is always in excess of apparent needs. Its staff of experts thoroughly understands the intricate traffic, tidal and channel conditions of New York Harbor.



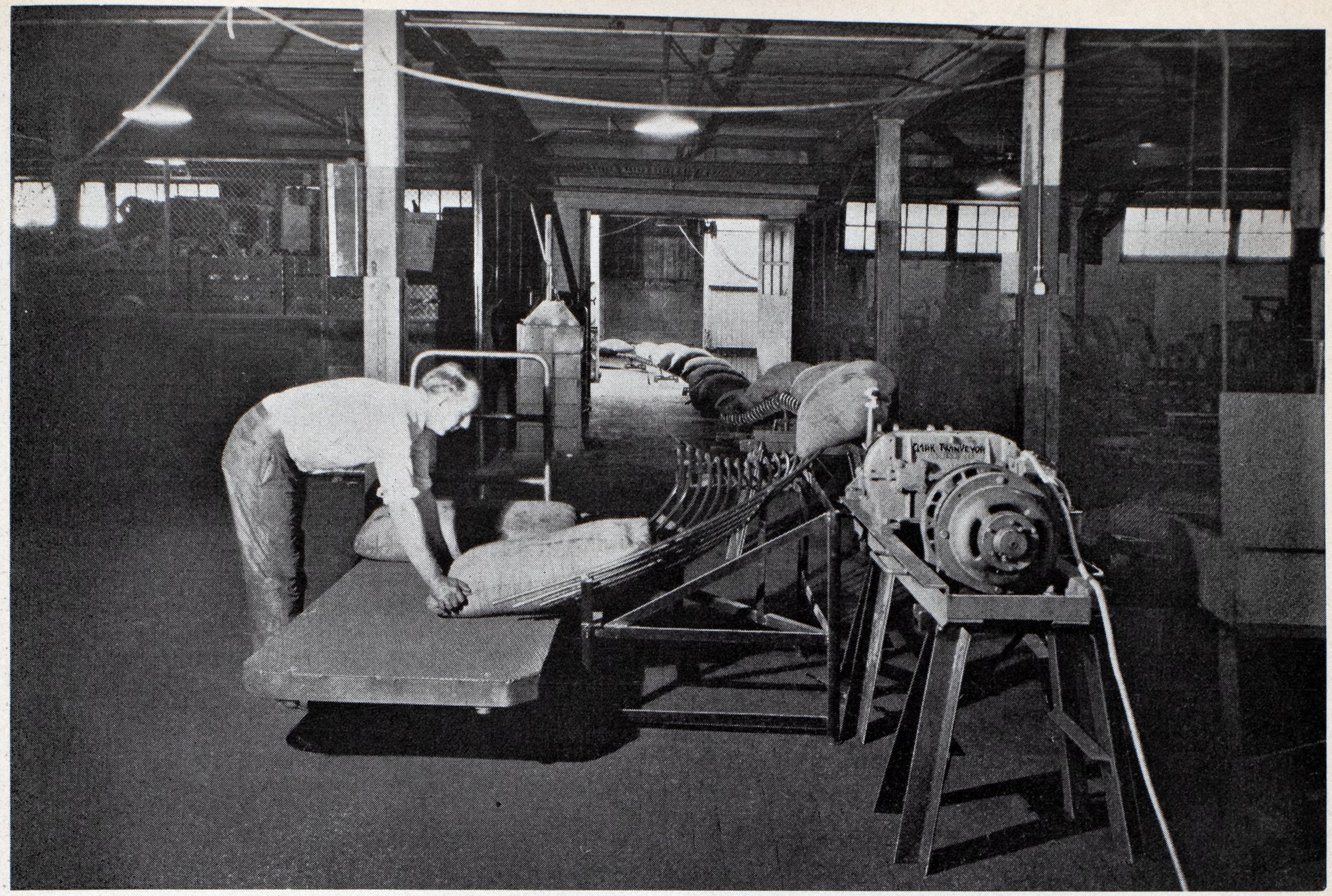

*The sea-going tug, "M. Moran," another of the Moran fleet, is 120 feet long, 700 H. P. She has done outstanding coastwise towing and made two transatlantic crossings.*

Moran Service includes coastal and long-distance towing, in which branches it has made notable records. One of the important functions of Moran Service is ship-handling. Domestic and foreign owners and operators thoroughly appreciate the value to them of Moran dependability. The value of their property and the importance of safe docking and undocking naturally calls for Moran Service.

MORAN TOWING AND TRANSPORTATION COMPANY, INC.

*17 Battery Place, New York* — *Phone Whitehall 1340*

MORAN Service



**Constant stream of package cargo from ship to warehouse. Bags travel up grade to power head—de-railer shunts them to trailers, truc-lifts, stackers or to co-ordinated conveyor line.**

# New Car Loading Kit Multiplies Uses of CLARK "TwinVeyor"

At an Eastern marine terminal, cargo-handling costs have been cut from 18c to 5c per ton, by use of Clark TwinVeyor. This is a series of dual sections of spiral tubes, turned toward each other by a power head. Cargo in bags, bales, packages, crates, cartons, placed on the TwinVeyor, travels swiftly, easily, noiselessly.

Now an auxiliary car loading and unloading kit is available for use as an assembly inserted in a standard TwinVeyor line wherever a right or left hand turn must be made. Thus package cargo may make a right angle turn coming out of 'tween-deck space, or entering warehouse or freight car, without transfer. Especially useful in loading and unloading cars and tight cargo space on ships.

Clark TwinVeyor is *easily portable*—sections removed or attached in one minute. It's *flexible*—regular equipment takes right or left angle of 15 deg. at any joint, an upward angle of 15 deg., downward 10 deg. Conveys, elevates, tiers—at remarkable reduction in handling costs—releases man power for other useful work.

Write for new bulletin describing the Clark TwinVeyor and for records of cargo-handling performance.

**The Clark Tructractor Co.**

**Battle Creek, Mich.**

Attach this ADVERTISEMENT to your inquiry

*Eight new Elwell-Parker Fork Type Trucks for the Mystic Terminal of Boston and Maine Railroad, Charlestown, Mass.*

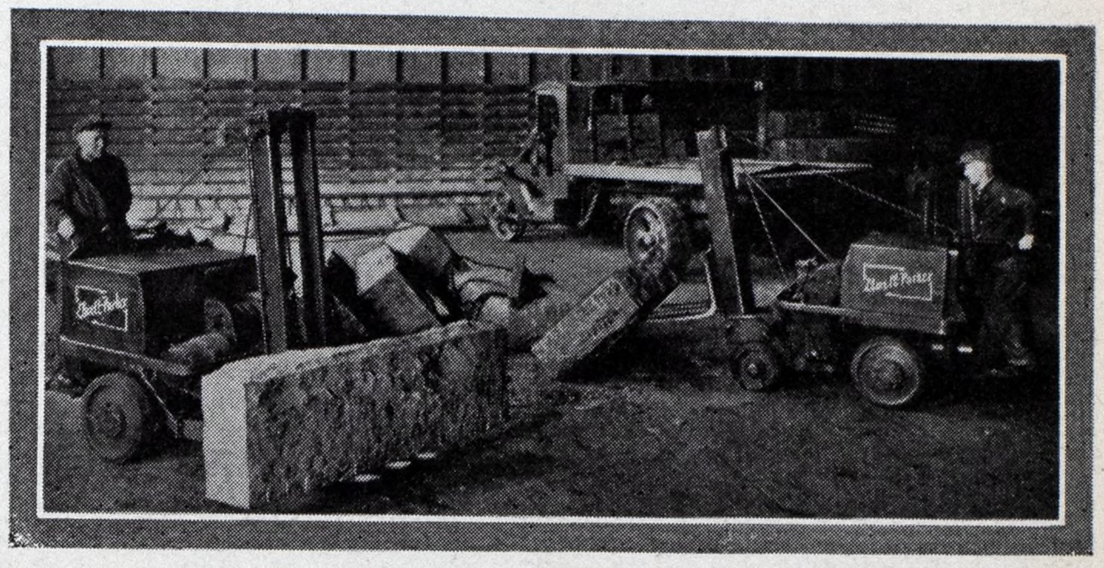
# Eight more Elwell-Parkers for Great Eastern Terminal

**THE value of Elwell-Parker Electric Trucks for marine freight handling is proved by the number of terminal superintendents who are constantly *ordering more.***

**In April, 1927, the first Elwell-Parker Electric Fork Type Truck went to work at the Mystic Terminal in Charlestown, Mass. Six weeks later, another was added, and in four weeks, another. More trucks were purchased in 1928, in 1929, and now, this November, eight more have just gone into service bringing the total to 32—an exclusive Elwell-Parker fleet.**

**Through the cooperation of an Elwell-Parker Field Engineer the jobs are completely planned in advance, so that each new truck received goes into immediate service.**

**Nearly every kind of commodity is handled including bales of wood pulp, bagged material, granite and bulk clay. It is estimated that each truck has paid for itself in less than three months of actual service.**



*Handling granite blocks at the Mystic Terminal. Elwell-Parker Electric Trucks reduced the cost of this operation from 60c per ton to 11c.*

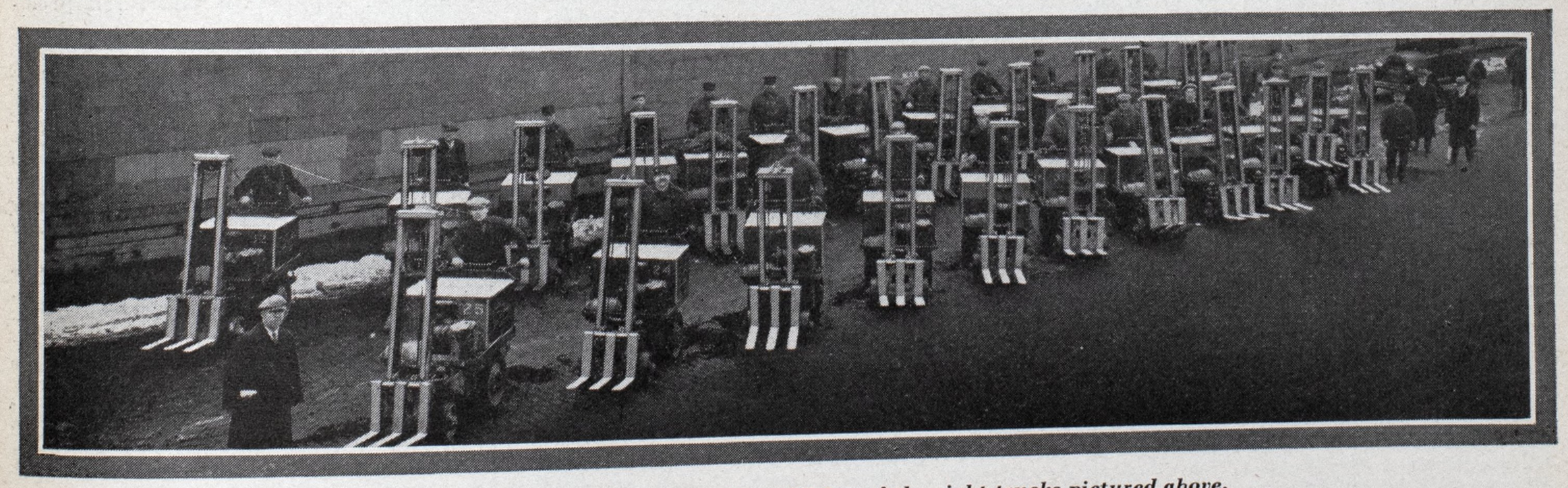
**Write for information about the Elwell-Parker Electric Fork Truck—or ask your nearest Elwell-Parker Field Engineer to explain its operation.**

**THE ELWELL-PARKER ELECTRIC COMPANY**

**4200 St. Clair Avenue** — **SHIP *on* SKIDS** — **Cleveland, Ohio**

# Elwell-Parker

**Designers and Builders of Electric Industrial Trucks, Tractors and Cranes for a Quarter Century**



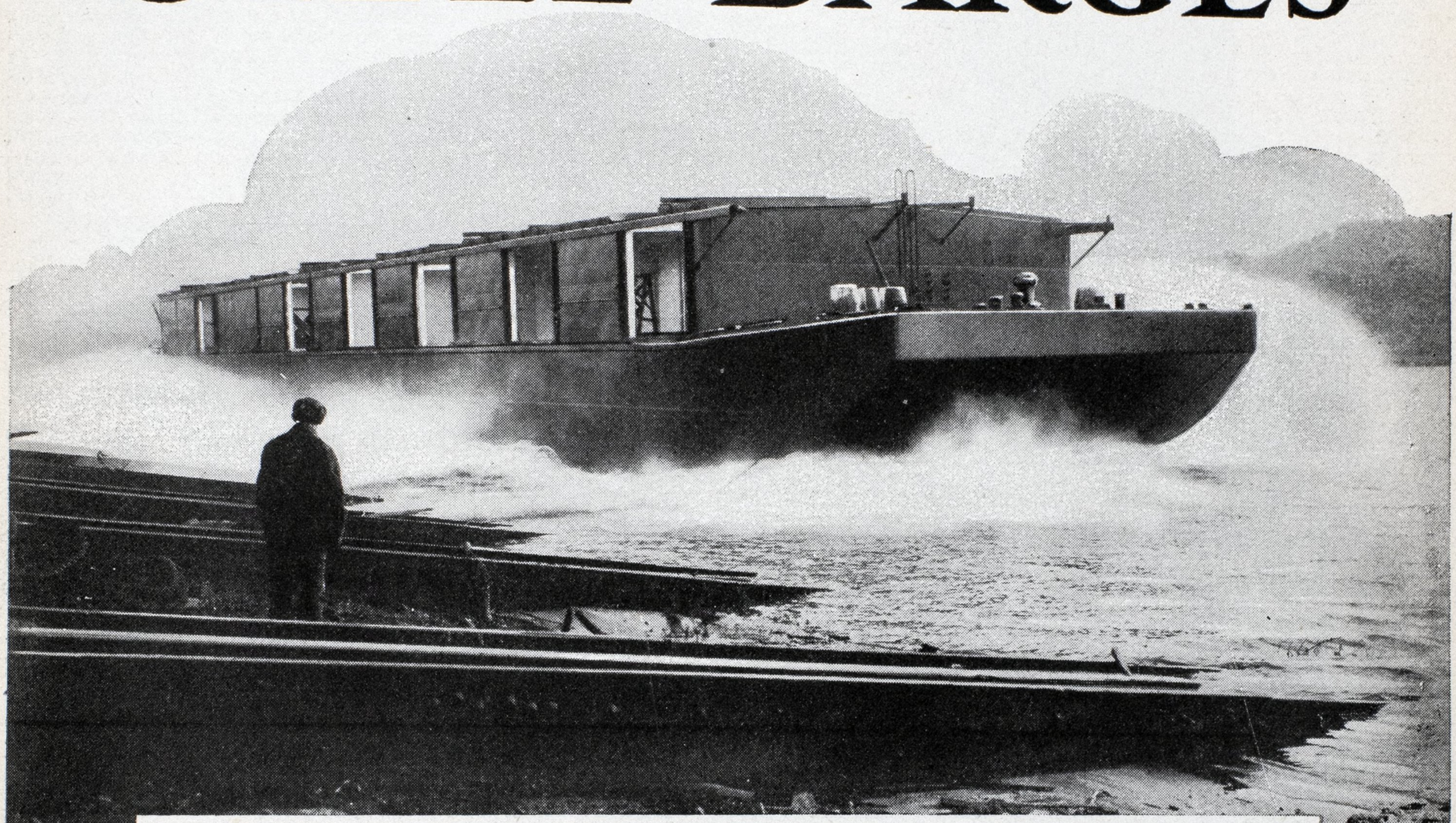
*The Mystic Terminal fleet prior to the addition of the eight trucks pictured above.*

SINCE 1903

# AMERICAN BRIDGE COMPANY

has given special attention to DESIGNING and BUILDING

# STEEL BARGES



THIS is the twenty-seventh consecutive year we have maintained the steel barge building yard at our structural steel fabricating plant at Ambridge, Pa. During this period of over a quarter of a century 1500 HULLS have been launched from the ways of this yard. Some of these were of unusual size or for special purposes, and include standard barges, fuel lighters, a floating hangar, floating dry docks, dump scows, derrick boats, etc.

The services of our engineering forces are available for the preparation of specifications and the development of size and type of steel barges to meet the standard or special requirements of users or prospective users of inland waterways.

*Inquiries are solicited and will be given prompt attention.*

## AMERICAN BRIDGE COMPANY

*Subsidiary of United States Steel Corporation*

***General Offices,*** **71 Broadway, New York, N. Y.**

*Pacific Coast Distributor:*

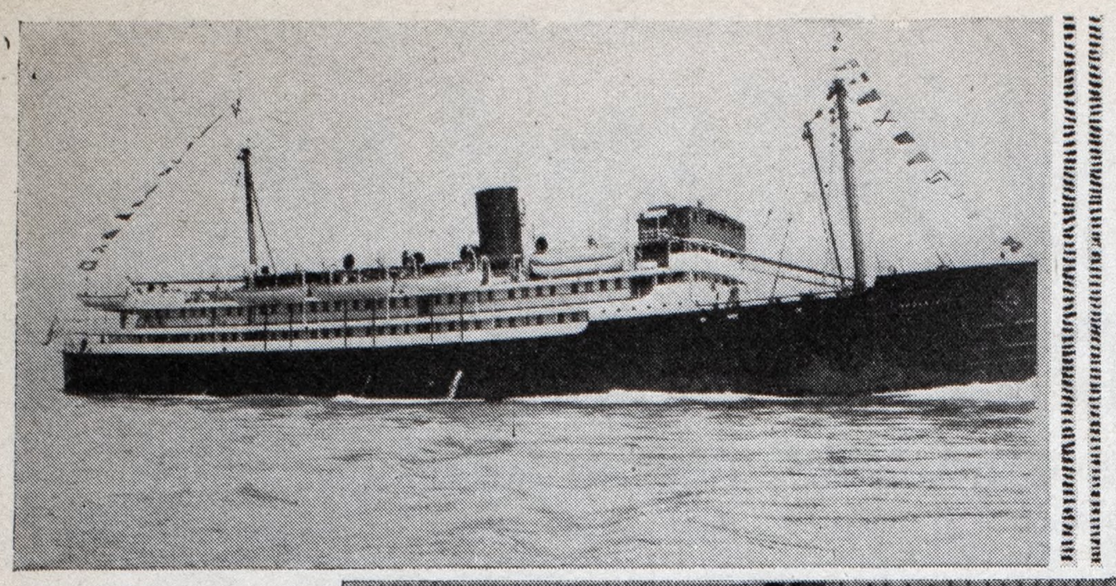
Columbia Steel Company

San Francisco, Calif. Los Angeles, Calif. Portland, Ore.
Seattle, Wash. Honolulu, T. H.

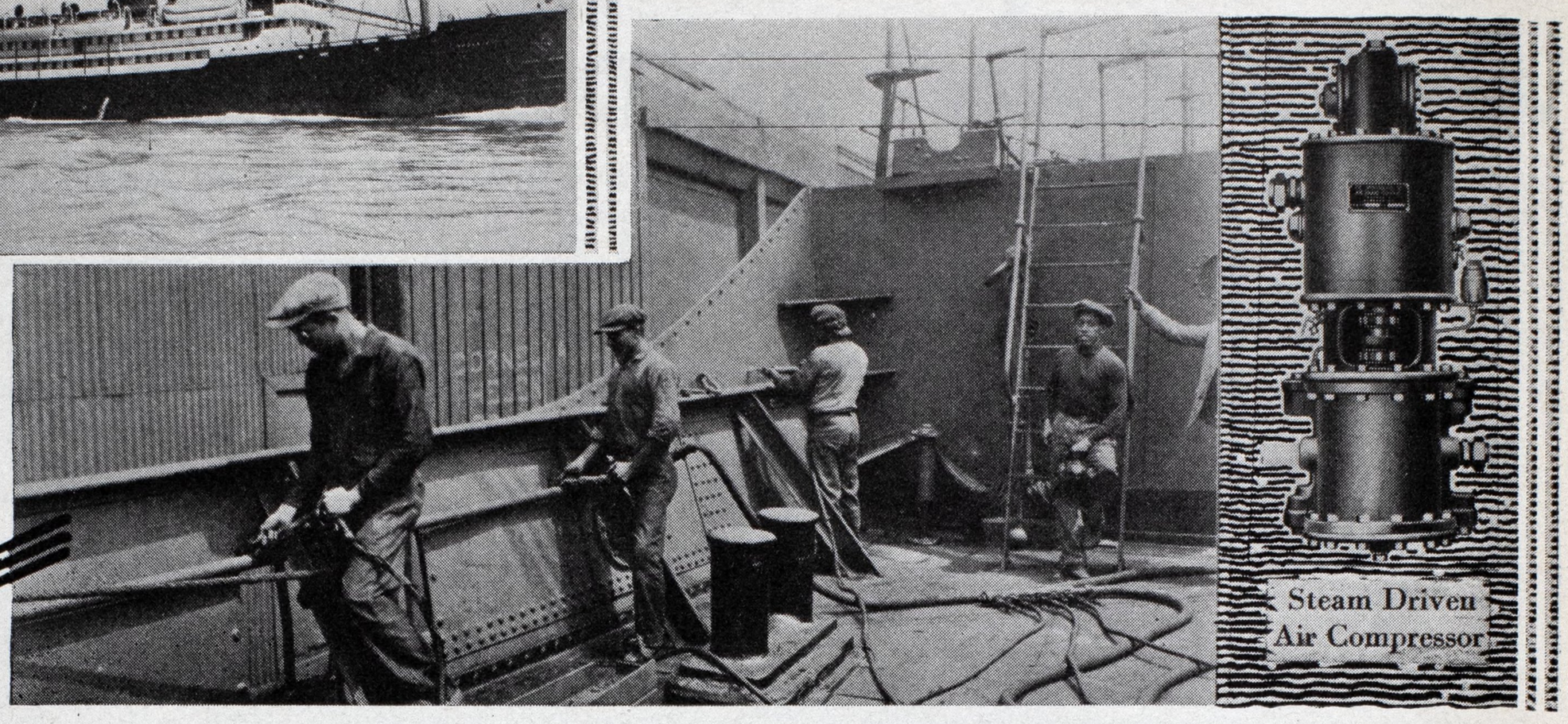
***Barge Department,*** **Frick Building, Pittsburgh, Pa.**

*Export Distributor:*

United States Steel Products Company
30 Church Street
New York, N. Y.

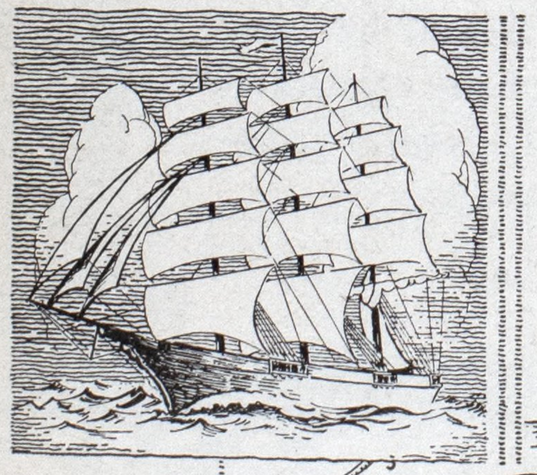


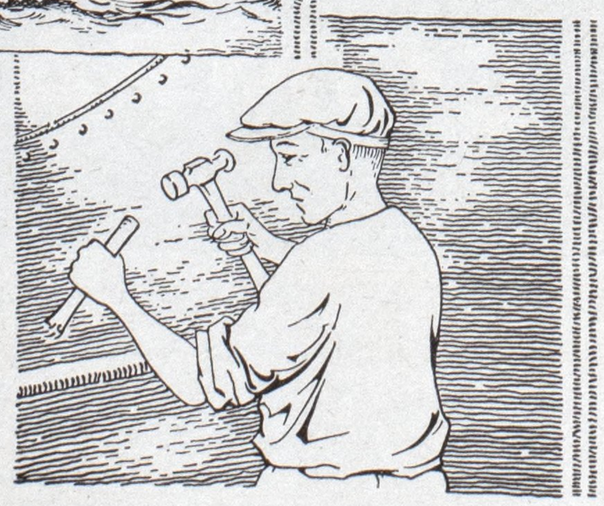
**Steamship HAULALAI ▲ ▲ ▲**
**Inter-Island Steam Navigation Co.**



Steam Driven Air Compressor

# THE NEW WAY replaces the OLD





**WOODEN sailing vessels have had their day - steamships of steel have taken their place. Power operation of auxiliary equipment, as well as of the ship itself, has largely superseded manual methods ▲ ▲ ▲ When it becomes necessary to remove paint, rust, or scale from a ship's hull, deck, or bulwark, it CAN be done by hand. But there is a quicker, better, more economical method - by pneumatic scaling hammers ▲ ▲ ▲ If the boat is equipped with a Westinghouse steam-driven air compressor this work can be readily done by the ship's crew while at sea. A complete compressor equipment and accessories can be purchased for the price of one contract for scaling by the old method ▲ ▲ ▲ Moreover, compressed air can thus be made available for other purposes such as cleaning machinery, spraying paint, and for operation of pneumatic tools to make emergency repairs. Many steamship companies have equipped their whole fleet of vessels with Westinghouse steam driven compressors ▲ ▲ ▲ We also make a complete line of motor-driven compressors, ranging from 2½ to 700 cu. ft. displacement, many of which are being used on board ship and ashore for every pneumatic requirement, with eminent success. ▲ ▲ ▲**

WESTINGHOUSE TRACTION BRAKE CO.
*Industrial Division* ' ' Pittsburgh, Pa.

▲ ▲ ▲ ▲ ▲

## WESTINGHOUSE-NATIONAL Air Compressors

*"Quality Machines for Quality Service"*

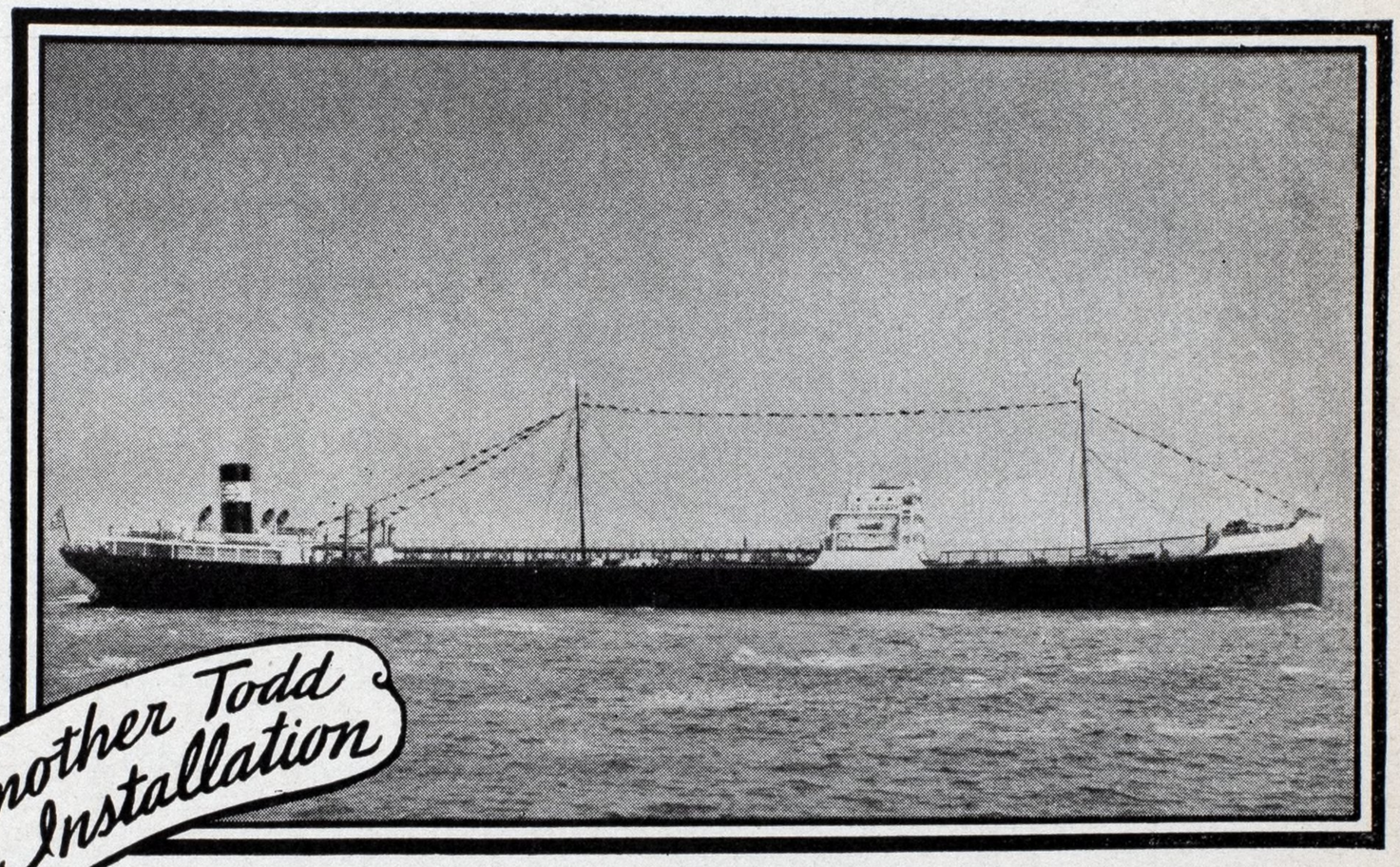
# Todd Oil Burners *fire the new Tanker* "G. Harrison Smith" *in completing her successful trials*

THE Standard Shipping Company's tanker "G. Harrison Smith" completed her trials on Wednesday, October 8th, and immediately proceeded on her initial trip to Cartagena. This is the first of two new tankers built by the Federal Shipbuilding and Dry Dock Company.

Embodying the very latest improvements in modern marine steam propulsion, it is expected that marked economies in the amount of fuel consumed per horse power developed through the installation of four Todd Oil Burning air registers and Mechanical Pressure Atomizing Burners, will result.

A boiler efficiency of 86.6% is confidently predicted as a result of the additional installation of duplicate oil heating and straining apparatus of the latest "Todd" standard marine equipment.

Altogether, the "G. Harrison Smith" is a decided advance in the art of shipbuilding as applied to Tanker service.




*The Standard Shipping Company's new tanker "G. Harrison Smith," built by Federal Shipbuilding & Dry Dock Company. Length, 525 ft. Beam, 74 ft. Depth, 40 ft. 6 in. Draft, 30 ft. 7½ in. Dead weight tons, 20,600 Speed, 11 knots. Tank capacity, 154,000 barrels. Class A. B. S. A-1 E. Engines, High Pressure Double Reduction Gear; DeLaval Turbines developing 4400 S.H.P. at 75 R.P.M. Boilers, 2 B. & W. Water Tube 5080 sq. ft., H. S. each.*

**PLANTS**

Robins Dry Dock & Repair Co.
*Erie Basin, Brooklyn, N. Y.*

Tietjen & Lang Dry Dock Co.
*Hoboken, N. J.*

Todd Shipbuilding & Dry Dock Co., Inc.
*Mobile, Ala.*

Todd Dry Dock Engineering & Repair Corp.
*Brooklyn, N. Y.*

Todd Engineering Dry Dock & Repair Co.
*New Orleans, La.*

Todd Dry Docks, Inc.
*Harbor Island, Seattle, Wash.*

Todd Oil Burners, Ltd.
*London, England*

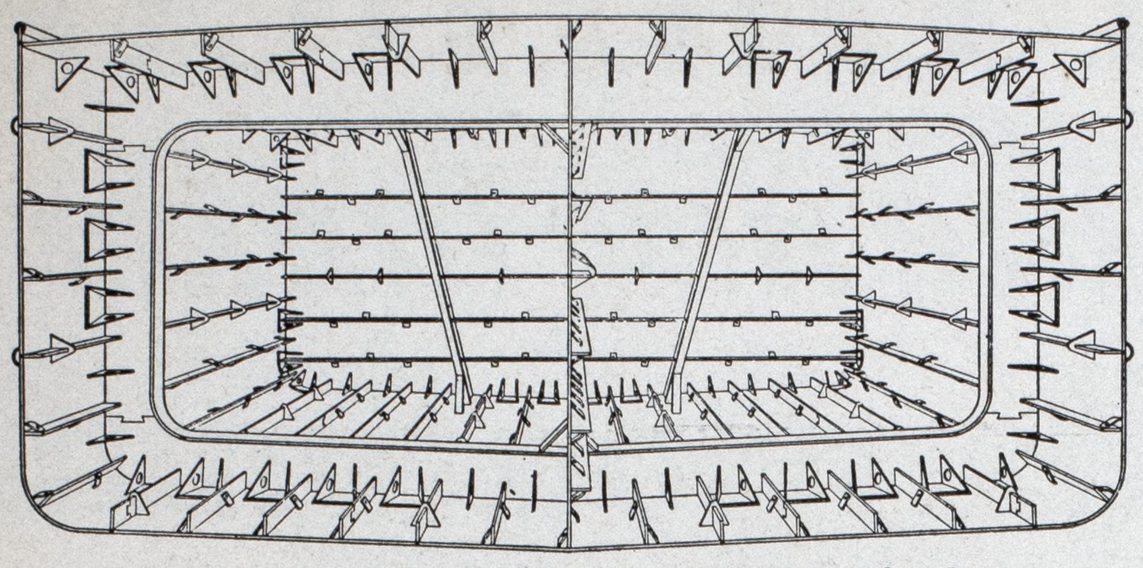
24 Floating Dry Docks
2 Graving Docks 3 Shipways

TODD DRY DOCK ENGINEERING AND REPAIR CORPORATION
*Plant of Todd Shipyards Corporation*
Foot of 23rd Street, Brooklyn, N.Y.

LARGEST DRY DOCK in NEW YORK HARBOR

TODD
NEW YORK, U.S.A.

# Reduces Construction Costs—Increases Carrying Capacity



*Midship Section of Transverse and Bulkhead*

Used in All Types of Ship Construction Including Barges, River Steamers and Dredges
Does away entirely with Angles, Shapes, Rivets and Bolts

## Richard F. Smith

**Patent Applied for**

## Lock Notch Welded System

**Charleston Dry Dock & Machine Company**
**Charleston, S. C.**

**Marine Boilers** — **Barges, Scows, Lighters**
**General Repairs to Wooden & Steel Vessels—**
**Two Marine Railways.**

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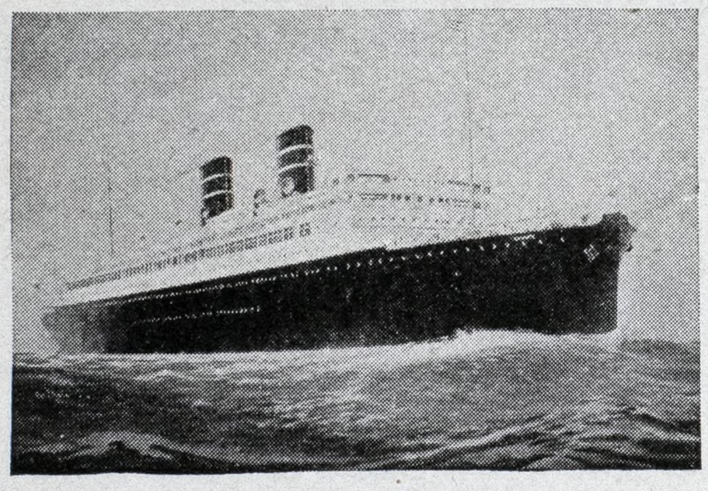
"The Standard for All Marine Installations"

## BRUNSWICK-KROESCHELL REFRIGERATION



## for the ORIENTE and MORRO CASTLE

BRUNSWICK-KROESCHELL COMPANY
ENGINEERS and MANUFACTURERS
REFRIGERATING and ICE MAKING MACHINERY
NEW BRUNSWICK, N. J. - - - CHICAGO, ILL.
Branches, Distributors and Service in Principal Ports

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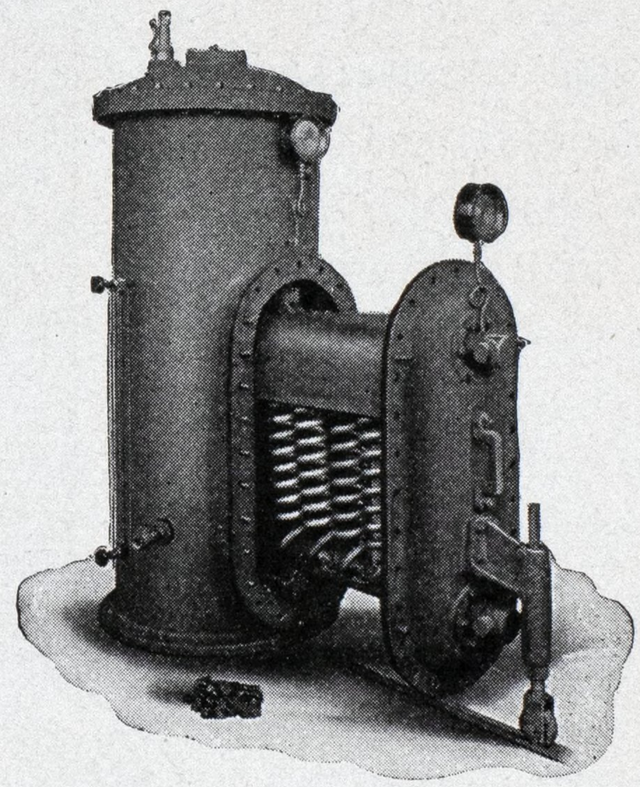
# G-R Evaporators

## the most widely used on shipboard



Assure pure boiler feed
Automatically scale-shedding
Increase boiler capacity

## The Griscom-Russell Co.

285 Madison Avenue, New York
Chicago, 20 N. Wacker Drive

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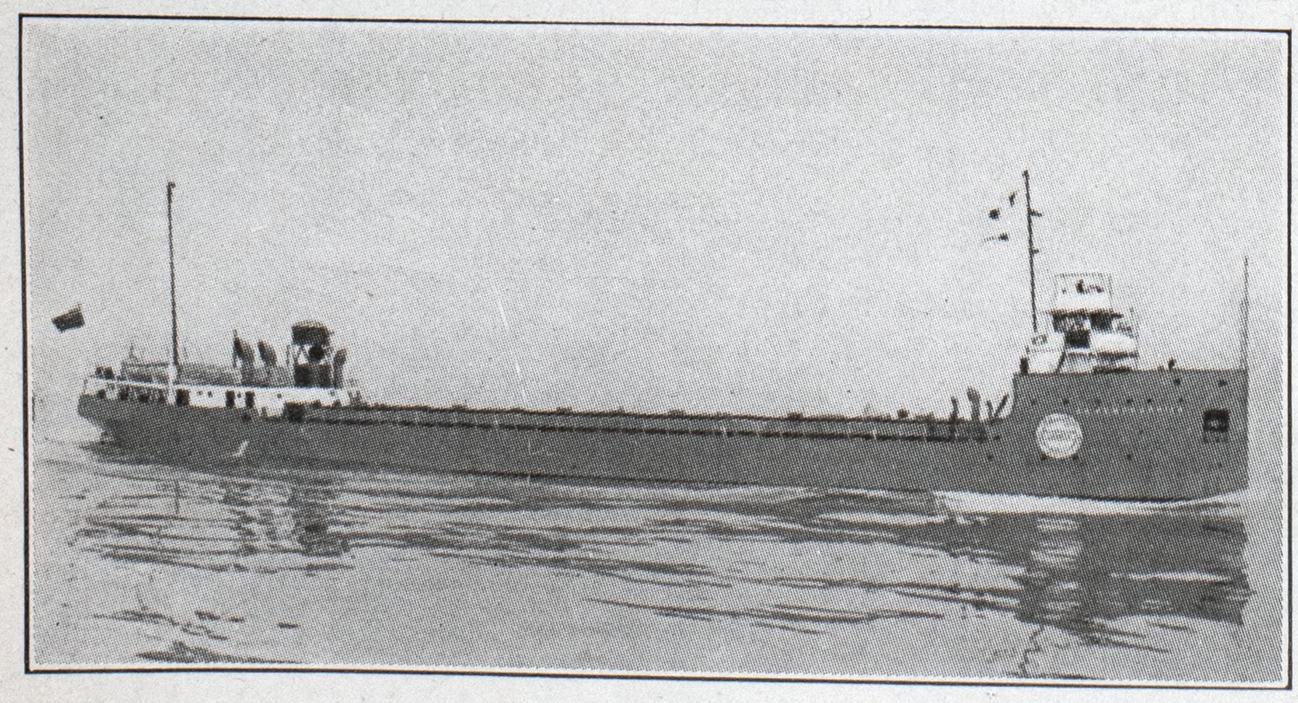


Motorship

## CEMENTKARRIER

***Equipped with***

## Leathem D. Smith Self-unloading System

handling bulk cement
in Gulf of St. Lawrence.

**LEATHEM D. SMITH DOCK CO.**

**20 N. Wacker Drive**
**Chicago, Ill.**

**Plant Location**
**Sturgeon Bay, Wis.**

# NEW YORK SHIPBUILDING COMPANY

*One mile of shipways and docks on the banks of the Delaware River*

Since its establishment thirty years ago, New York Shipbuilding Company has built over 400 vessels aggregating approximately 1,000,000 gross tons of merchant ships and 500,000 displacement tons of naval vessels.

•

This yard now has under construction the two largest and highest powered American-built merchant ships.

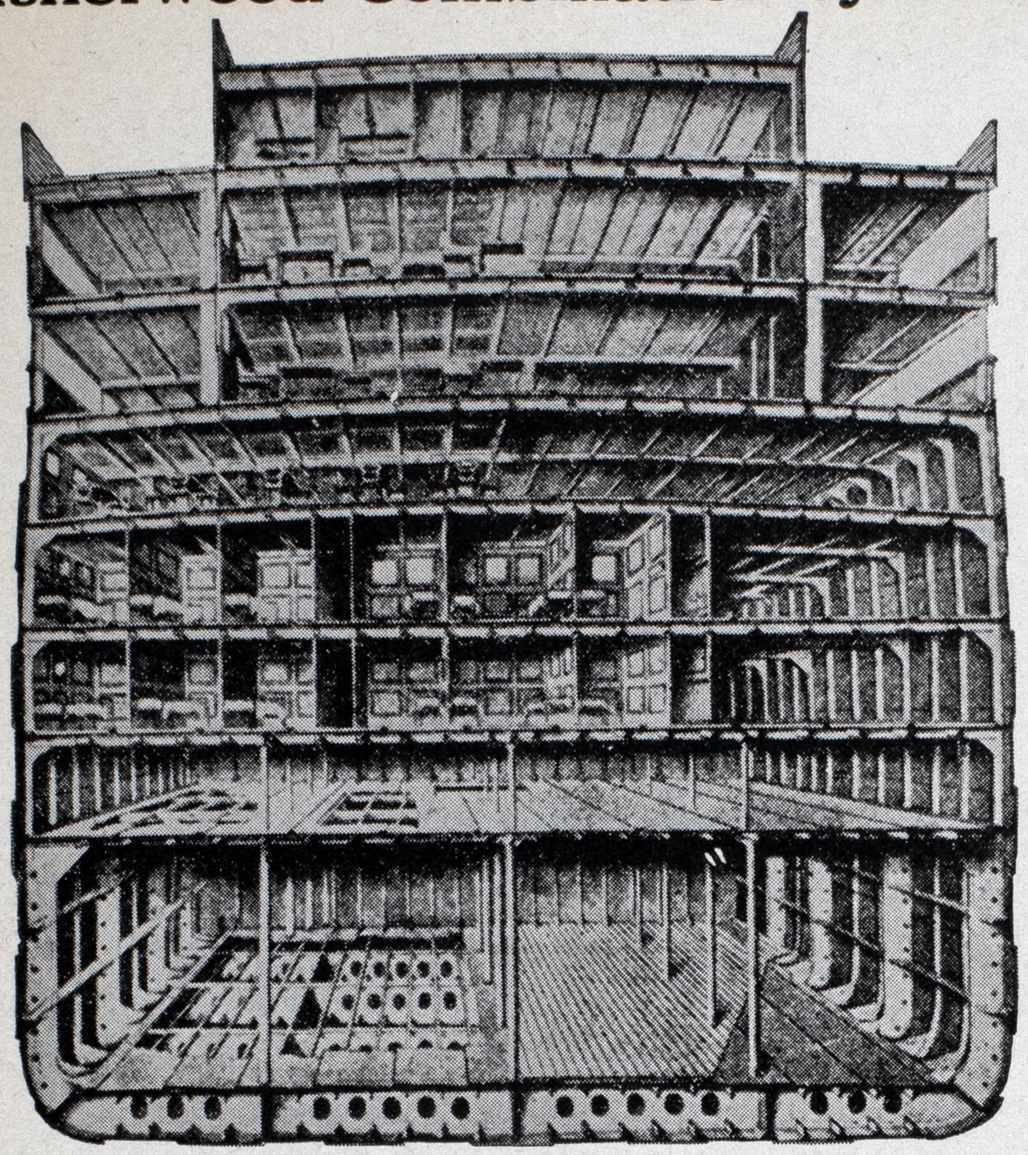
•

# NEW YORK SHIPBUILDING CO.

*Main Office and Works:*
CAMDEN, N. J.

*New York Office:*
420 LEXINGTON AVE.

## Isherwood Combination System



Sectional View of Interior of Passenger Liner designed on the Isherwood Combination System
(*In a vessel of this type, deep transverses are recommended for hold construction, but are not essential.*)
Adaptable to any type but particularly advantageous for passenger liners.

Shipowners are advised to specify that plans and structural arrangements should be approved by

SIR JOSEPH W. ISHERWOOD & CO., Ltd.
17 BATTERY PLACE, NEW YORK
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**Single Style & Duplex**
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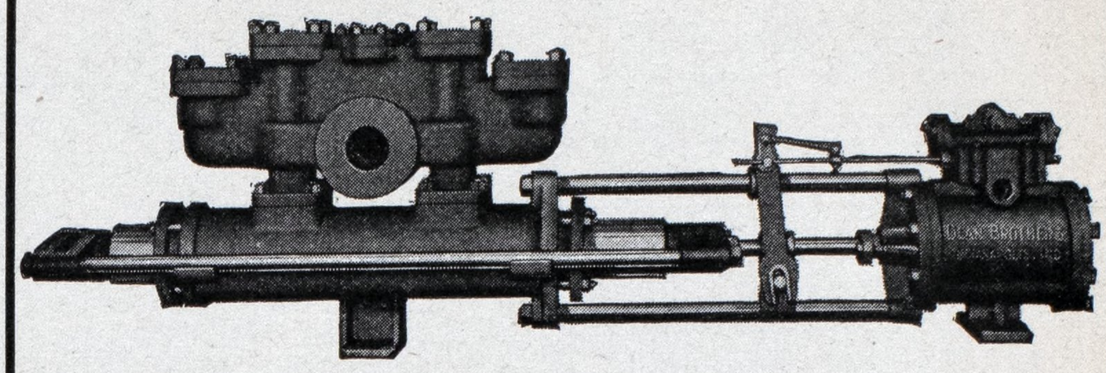

**Figure No. 2311 Horizontal Single Style Double Acting Outside End Packed Plunger Trombone Pot Valve Pump For Boiler Feed & Pressure Service.**

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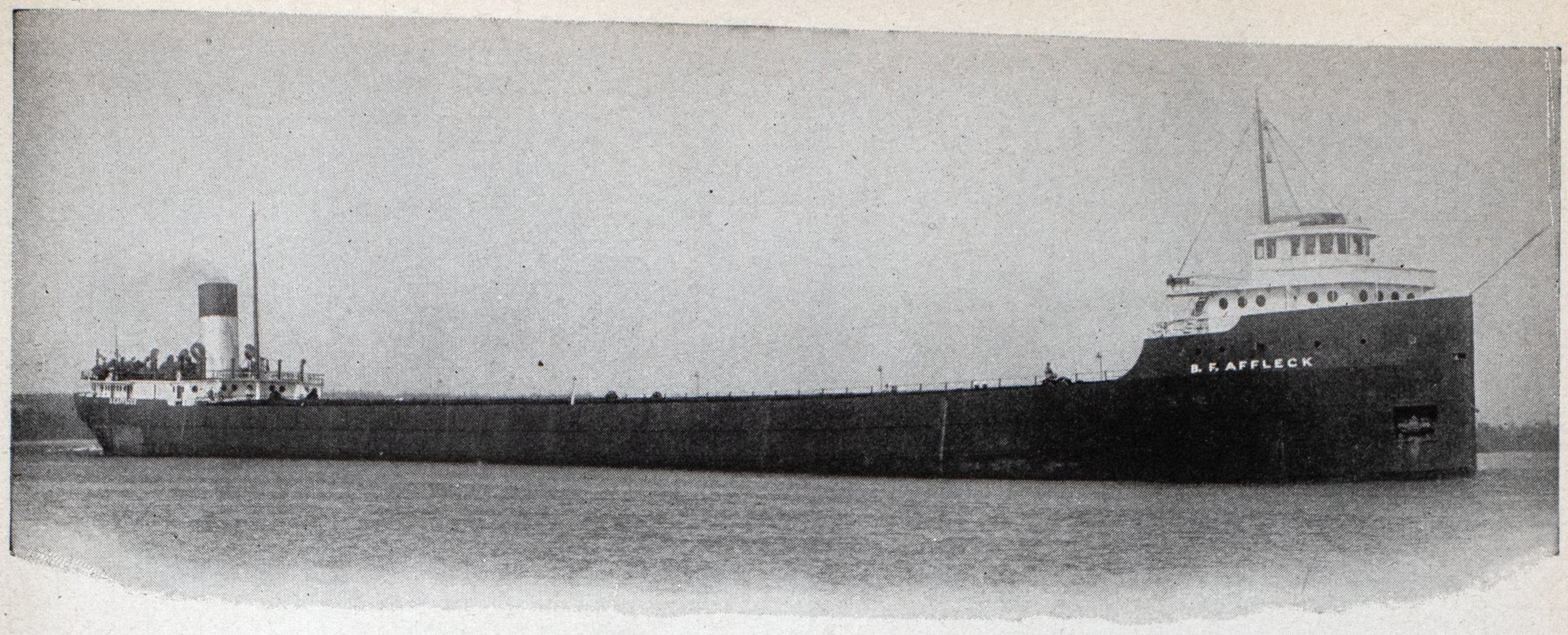


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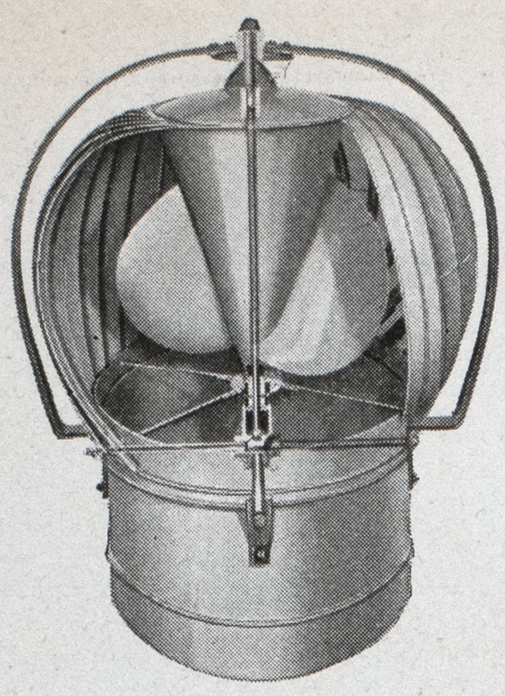

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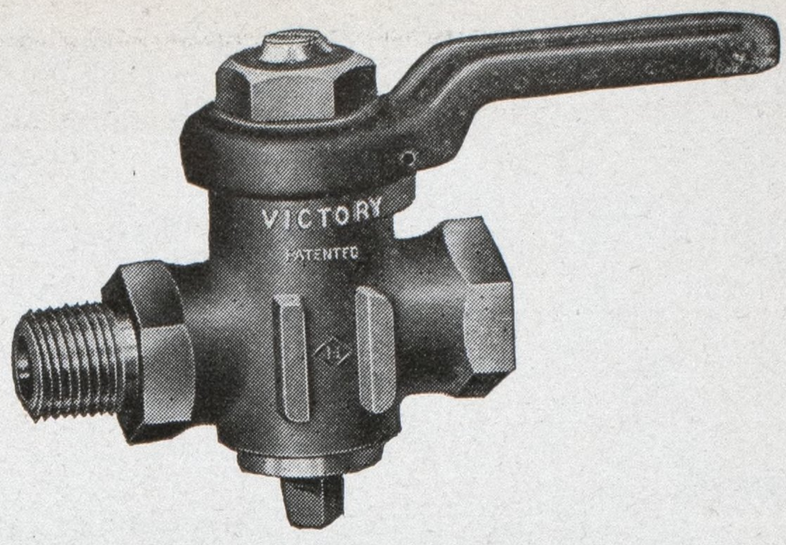


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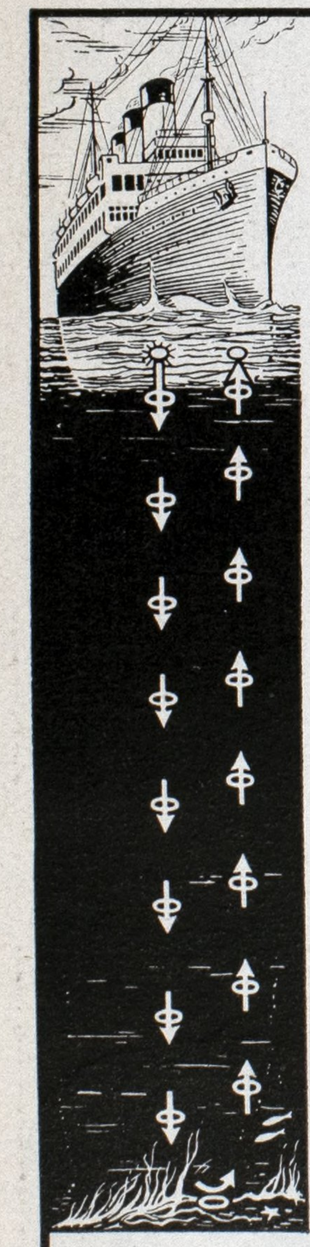

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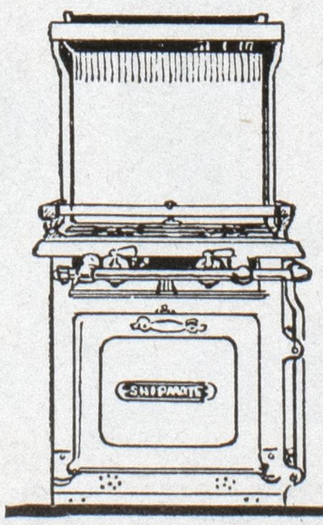


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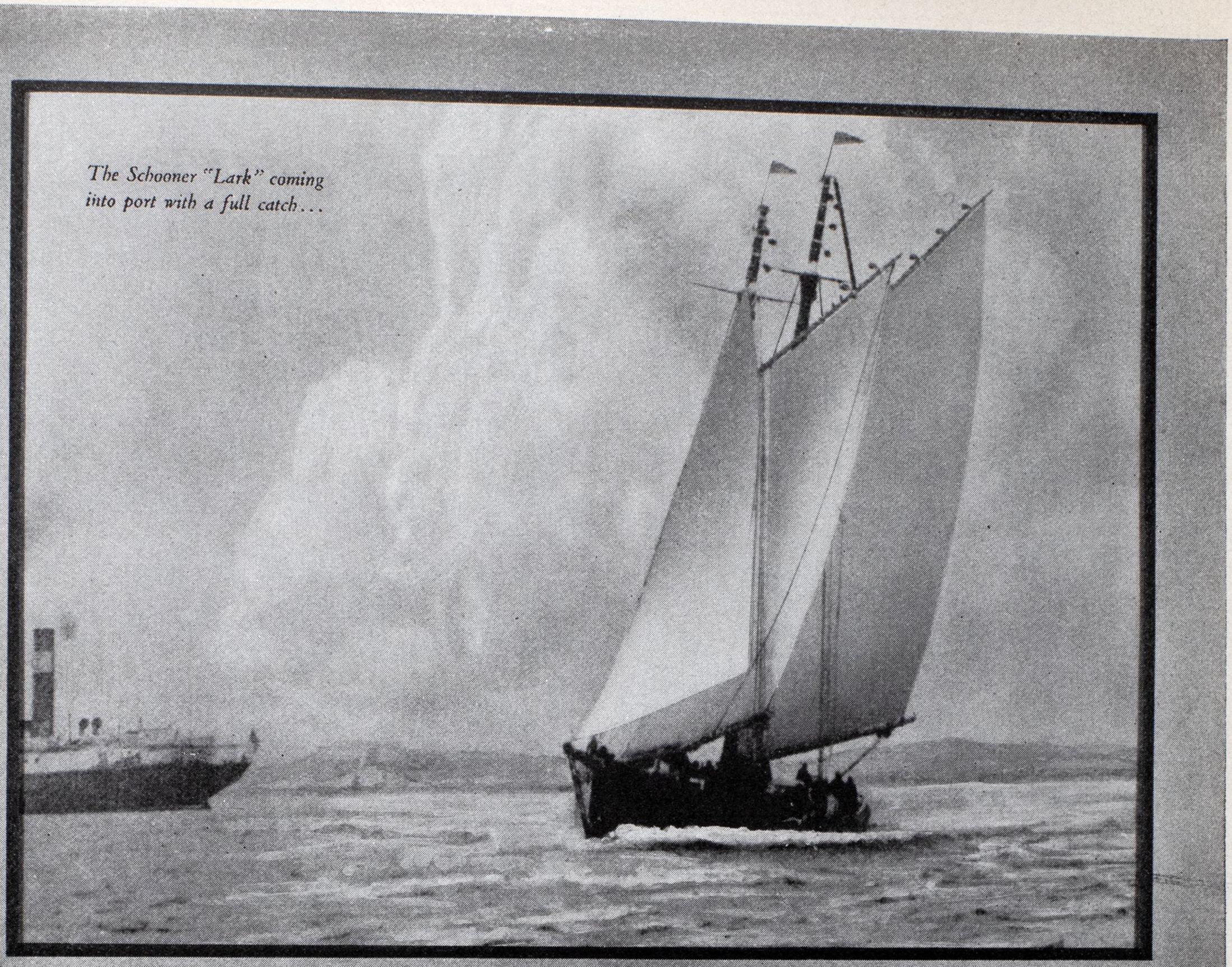


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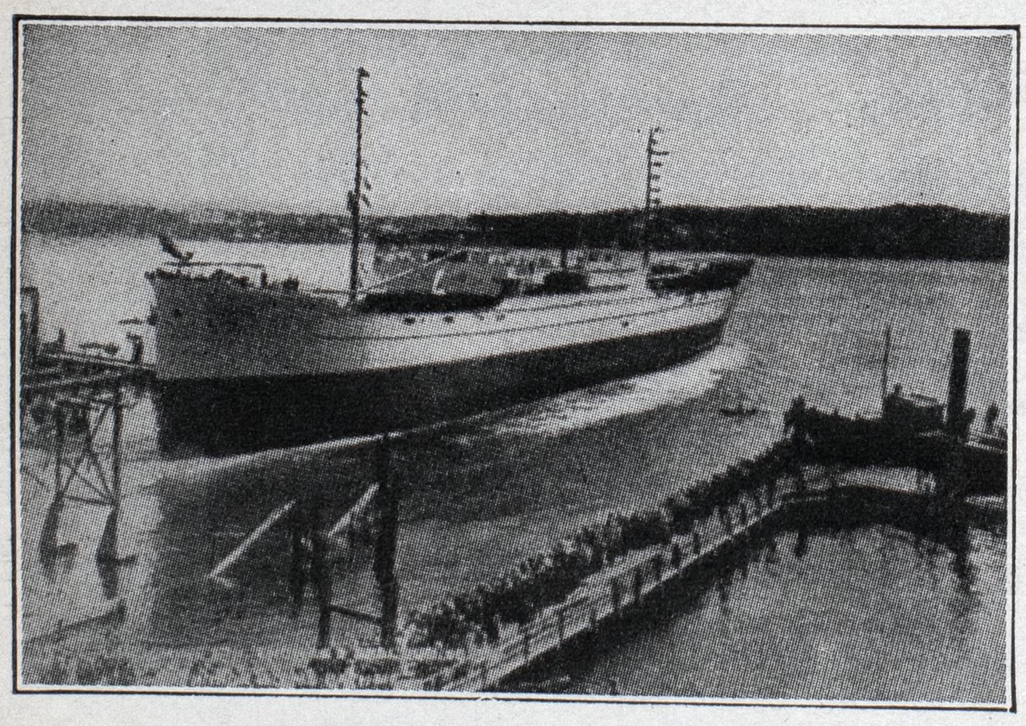

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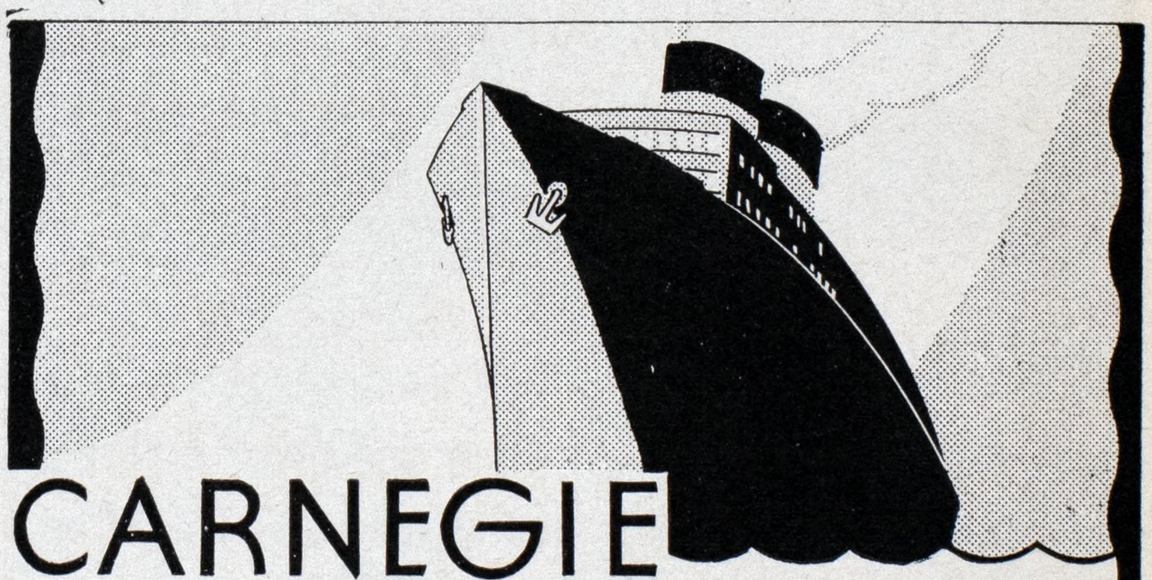

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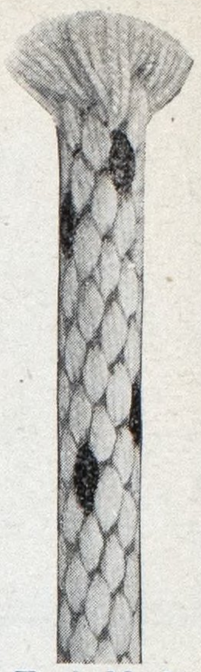

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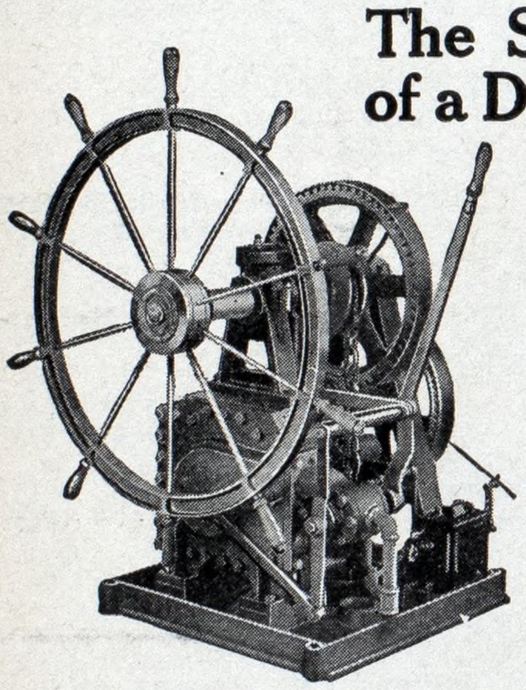

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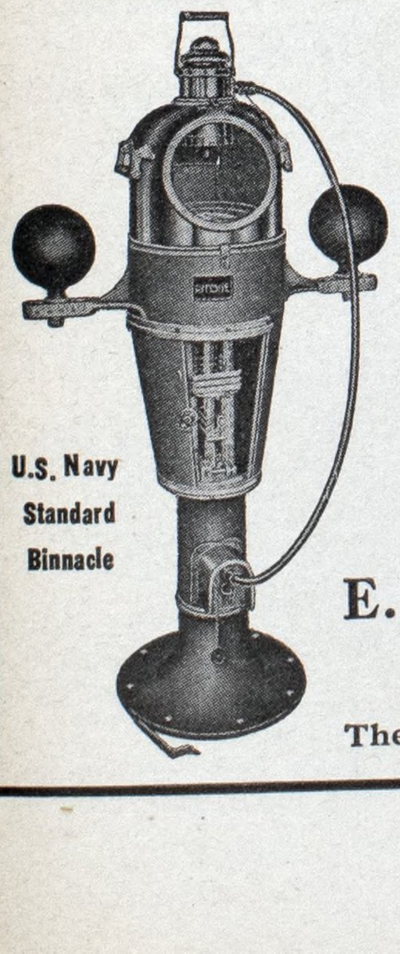

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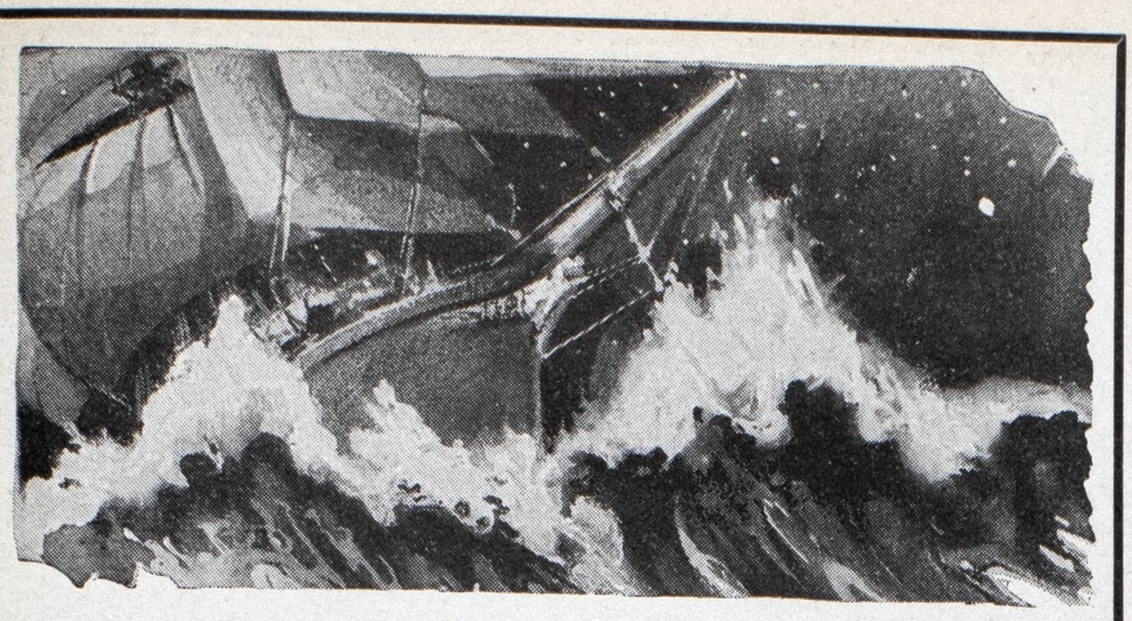
Standard Motor Construction Co.,
172 Whiton St., Jersey City, N. J.



*"Who hath desired the sea?—*
*the immense and contemptuous surges?*
*The shudder, the stumble, the swerve,*
*as the star-splitting bowsprit emerges?"*
RUDYARD KIPLING

DOWN plunges her nose, buried in stormy seas. Waves pound her sides, and break swirling over decks. Lee scuppers under. Yet on she goes, riding the waves without fear, deck and side seams right-caulked with

# STRATFORD OAKUM

Sailormen like Stratford Oakum—they know it and use it. And so did their granddads, nearly a hundred years ago. They knew, as you will know, that there is only one oakum to use, and it is Stratford.

Do not accept a substitute, there is none "just as good."

**George Stratford Oakum Company**
**JERSEY CITY, NEW JERSEY**
*Also manufacturers of cotton wiping waste*

## PROPULSION AND AUXILIARY MACHINERY

Geared Turbine
Turbine Electric
Diesel Electric
Condensers

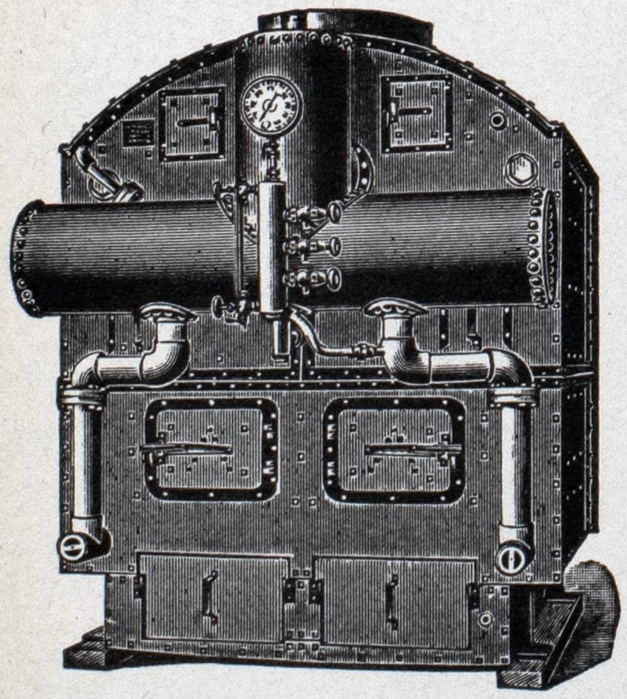
Auxiliary Motors and Control
Electric Galley Ranges
Electric Heaters

# Westinghouse

**Electric & Manufacturing Company**

**Sales Offices in All Principal Cities**
**Service Stations in All Principal American Ports**

T-31103



**Almy Water Tube Boiler Co.**

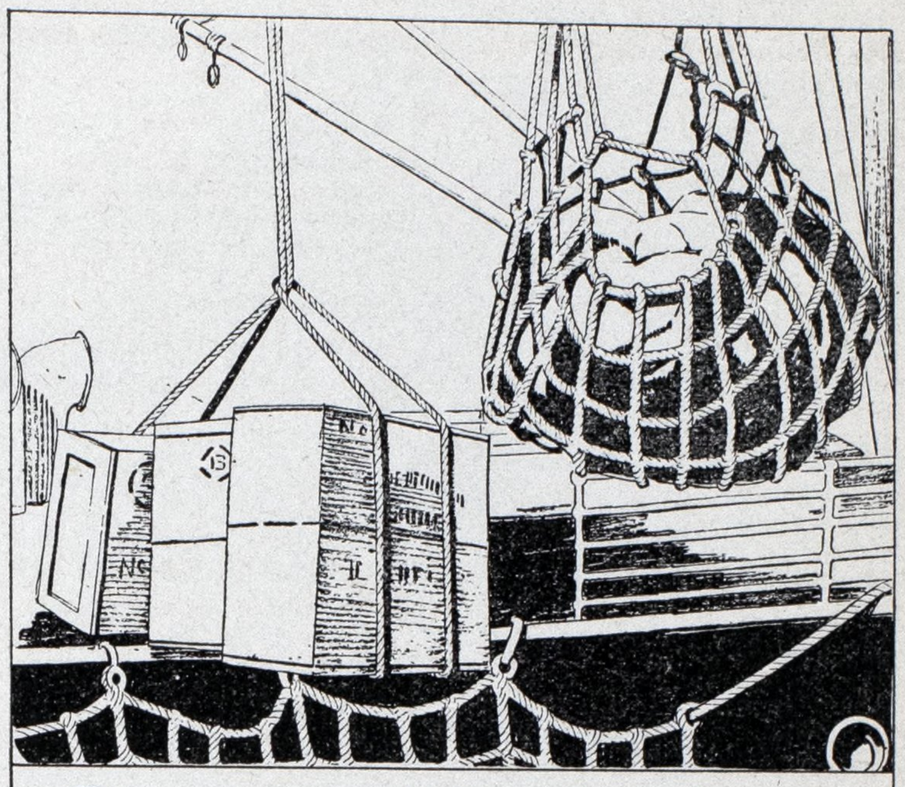
Builders of Sectional Water Tube Boilers for all types of vessels

**Providence, R. I. U. S. A.**

*CATALOGUE FREE*

# WHITLOCK WATERFLEX CORDAGE

PAT'D AUG. 3, 1926. REG. U.S. PAT. OFF.



## Cargo Hoisting

CARGO HOISTING is one of the many purposes for which Whitlock WATERFLEX Cordage is ideal. Rope can be put to no harder use—and replacements are both annoying and expensive. You take no chance with WATERFLEX.

Being truly water-resisting, WATERFLEX is unaffected by dampness, rain or other adverse weather conditions. It is permanently lubricated and remains flexible at all times.

WATERFLEX will not swell or kink. Retaining its original size and lay, it will run freely through blocks and handle readily around hoisting winches.

Because of its superior strength and lasting qualities, WATERFLEX is the choice of critical users and discriminating buyers of cordage everywhere.

WATERFLEX is manufactured under exclusive Whitlock patents and supervision, and offers many outstanding advantages at no additional cost.

## WHITLOCK CORDAGE COMPANY

**46 South Street, New York**

*Factory and Warehouses*
Jersey City, N. J.

*Branches*
Chicago, Boston, Kansas City *and* Houston

**ENGINES (Marine)**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Ingersoll-Rand Co., 11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sturtevant, B. F., Co., Inc., Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

**ENGINES (Oil)**
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Ingersoll-Rand Co., 11Broadway, New York City.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

**ENGINES (Steam, Steering)**
Dake Engine Co., Grand Haven, Mich.

**EUROPEAN STEAMSHIP LINES (Passenger and Freight)**
Hamburg-American Line 39 Broadway, New York City.

**EVAPORATORS**
Griscom-Russell Co., 285 Madison Ave., New York City.

**FANS (Electric)**
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**FAUCETS**
Haydenville Co., The, Haydenville, Mass.

**FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)**

**FEED WATER REGULATORS**
Babcock & Wilcox Co., 85 Liberty St., New York City.

**FIRE BRICK**
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

**FLOODLIGHTS (Acetylene)**
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City.

**FLOORING**
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

**FLOOR PLATES**
Carnegie Steel Co., Carnegie Bldg., Pittsburgh, Pa.

**FOUNDERS**
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
New York Shipbuilding Co., Camden, N. J.

**FREIGHT SERVICE**
Hamburg-American Line, 39 Broadway, New York City.

**FUEL OIL**
Standard Oil Co. of New Jersey, 26 Broadway, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

**FURNITURE (Metal)**
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

**GALLEY RANGES**
Stamford Foundry Co., Stamford, Conn.

**GEARS (Marine Equipment)**
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**GENERATING SETS (Direct Connected)**
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**GENERATORS**
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**GRAPHITE**
Dixon, Jos., Crucible Co., Jersey City, N. J.

**GRAPHITE GREASES**
Dixon, Jos., Crucible Co., Jersey City, N. J.

**GRAPHITE PAINT**
Dixon, Jos., Crucible Co., Jersey City, N. J.

**GRAPHITE PIPE JOINT COMPOUNDS**
Dixon, Jos., Crucible Co., Jersey City, N. J.

**GREASE**
Vacuum Oil Co., 61 Broadway, New York City.

**GREASE (Launching)**
Vacuum Oil Co., 61 Broadway, New York City

**GYRO-PILOT (Automatic Steering)**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**HATCH COVERS**
MacGregor & King, Ltd., 5 Lloyd's Ave. E. C. 3, London, Eng.

**HAWSERS (Manila)**
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

**HEATERS AND PURIFIERS (Feed Water)**
Davis Engineering Co., 90 West St., New York City.
Griscom-Russell Co., 285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**HEATING EQUIPMENT**
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**HEATING STOVES**
Stamford Foundry Co., Stamford, Conn.

**HOISTING ENGINES**
Hyde Windlass Co., Bath, Me.

**HOISTS (Air)**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co., 11 Broadway, New York City

**INDICATORS (Direction & Revolution)**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**INDICATORS (Helm Angle)**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**INDICATORS (Speed)**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**ICE MACHINES—See REFRIGERATING MACHINERY**

**INSURANCE (Marine)**
Boland & Cornelius, Marine Trust Bldg., Buffalo, N. Y.

**LAMPS (Mazda and Arc)**
General Electric Co., Schenectady, N. Y.

**LIFEBOATS**
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp., 3-5 Vernon Ave., Long Island City, N. Y.

**LIFESAVING EQUIPMENT**
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

**LIGHTING EQUIPMENT**
Westinghouse Electric & Mfg. Co. S. Philadelphia, Pa.

**LUBRICATING OIL**
Standard Oil Co., of New Jersey, 26 Broadway, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

**MACHINERY (Marine)**
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Cooper-Bessemer Corp., The, Grove City, Pa.
Great Lakes Engineering Works. River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc. Wis.
Maryland Dry Dock Co., Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

**MACHINES (Sounding)**
Submarine Signal Co., 160 State St., Boston, Mass.

**MACHINISTS**
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts., St. Louis, Mo.
New York Shipbuilding Co., Camden, N. J.

**MAGNETS (Lifting)**
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

**MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)**

**MARINE RAILWAY BUILDERS**
Crandall Engineering Co., The, 134 Main St., Cambridge, Mass.

**MATERIAL HANDLING EQUIPMENT**
Lidgerwood Mfg. Co., Elizabeth, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

**MATTRESSES**
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

**METERS (Gas & Air)**
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

**MOTOR GENERATOR SETS**
General Electric Co., Schenectady, N. Y.
Troy Engine & Machine Co., Troy, Pa.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**MOTORS (Electric)**
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

**NAUTICAL INSTRUMENTS**
Ritchie, E. S., & Sons, Brookline, Mass.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**NAVIGATING INSTRUMENTS**
White, Kelvin & Wilfrid O., Co., 112 State St., Boston, Mass.

**NEON**
Linde Air Products Co., The, 30 E. 42nd St., New York City.

**NITROGEN**
Linde Air Products Co., 30 East 42nd St., New York City

**OAKUM (Marine, Rope, Packings, Plumbers)**
Stratford, George, Oakum Co., 120 Montgomery St., Jersey City, N. J.

**OIL BURNING EQUIPMENT**
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Coen Co., Inc., 610 S. Broadway, Los Angeles, Cal.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

**OIL FOR ALL PURPOSES (Marine)**
Vacuum Oil Co., 61 Broadway, New York City.

**OXY-ACETYLENE APPARATUS**
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

**OXYGEN**
Linde Air Products Co., 30 East 42nd St., New York City.

**PASSENGER SERVICE**
Hamburg-American Line, 39 Broadway, New York City.

**POWDERED COAL BURNERS**
Coen Co., Inc., 610 S. Broadway, Los Angeles, Cal.

**PROPELLER BLADES AND HUBS**
Sheriffs Mfg. Co., Milwaukee, Wis.

**PROPELLER WHEELS**
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.

**PROPELLERS**
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.

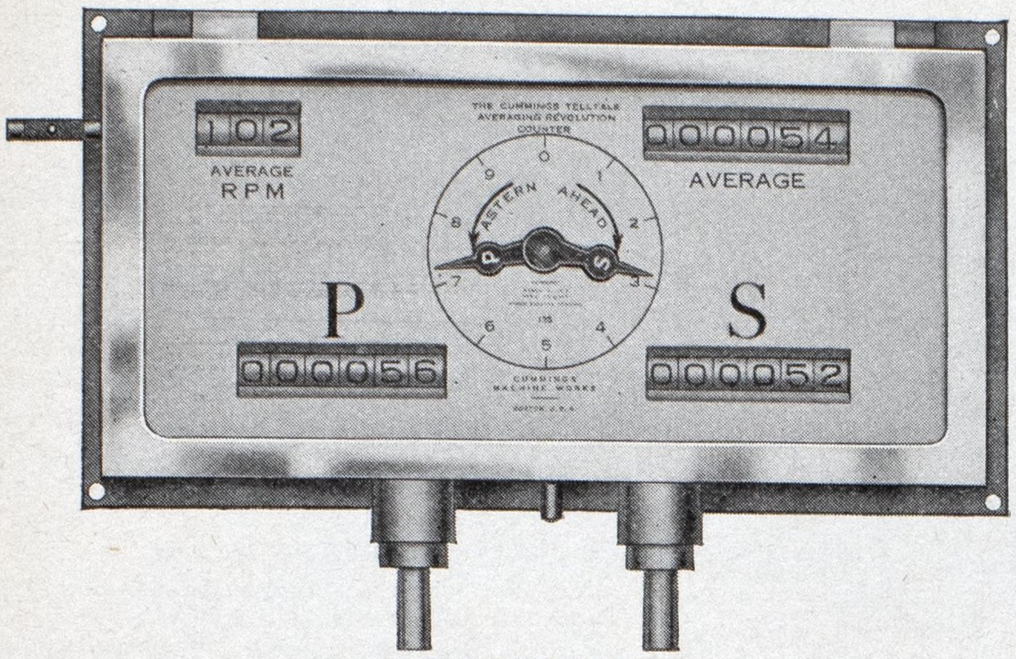
**PULVERIZED COAL BURNERS**
Fuller-Lehigh Co., Fullerton, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.

**PULVERIZED COAL SYSTEMS**
Fuller-Lehigh Co., Fullerton, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.

**PUMPS**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above**

## CUMMINGS NEW TWO SHAFT TELLTALE AVERAGING COUNTER




ALL IN ONE CASE

15 SECONDS TO GET AVERAGE R P M

Total Revolutions for the Port and Starboard Shafts. The Two Hand Telltale shows at a glance the actual Performance of Each Shaft ahead and back and the proportionate speed of each.

## TORSION METERS

### For Both Solid and Hollow Shaft

***Full particulars upon application***

**Cummings Machine Works**

**255 Atlantic Ave., Boston, Mass.**

---

**Seeking a Steamship Office in Philadelphia?—*Here it is!***

**GROUND FLOOR—N. W. COR. 15TH AND LOCUST STREETS**

Opposite White Star Line, Canadian Pacific, Bartlett Tours, Frank Tourist Co. and surrounded by other prominent steamship offices. An attractive office—at a moderate rental.

**ALBERT M. GREENFIELD & CO.**
Walnut & Juniper Sts. Philadelphia.

---

# Edward P. Farley & Co.

**Incorporated**

Steamship Owners, Agents and Brokers

**11 Broadway—New York**

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John J. Boland Adam E. Cornelius

# BOLAND & CORNELIUS

VESSEL OWNERS AND BROKERS
Marine Insurance Agents

Marine Trust Building BUFFALO, N. Y.

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## Ship For Sale?

**If you have a passenger ship, freighter, tanker, tug or any other floating property or marine equipment for sale advertise it in Marine Review.**

**The rate is $3.00 for a minimum advertisement of 30 words. Additional words, 10c each.**

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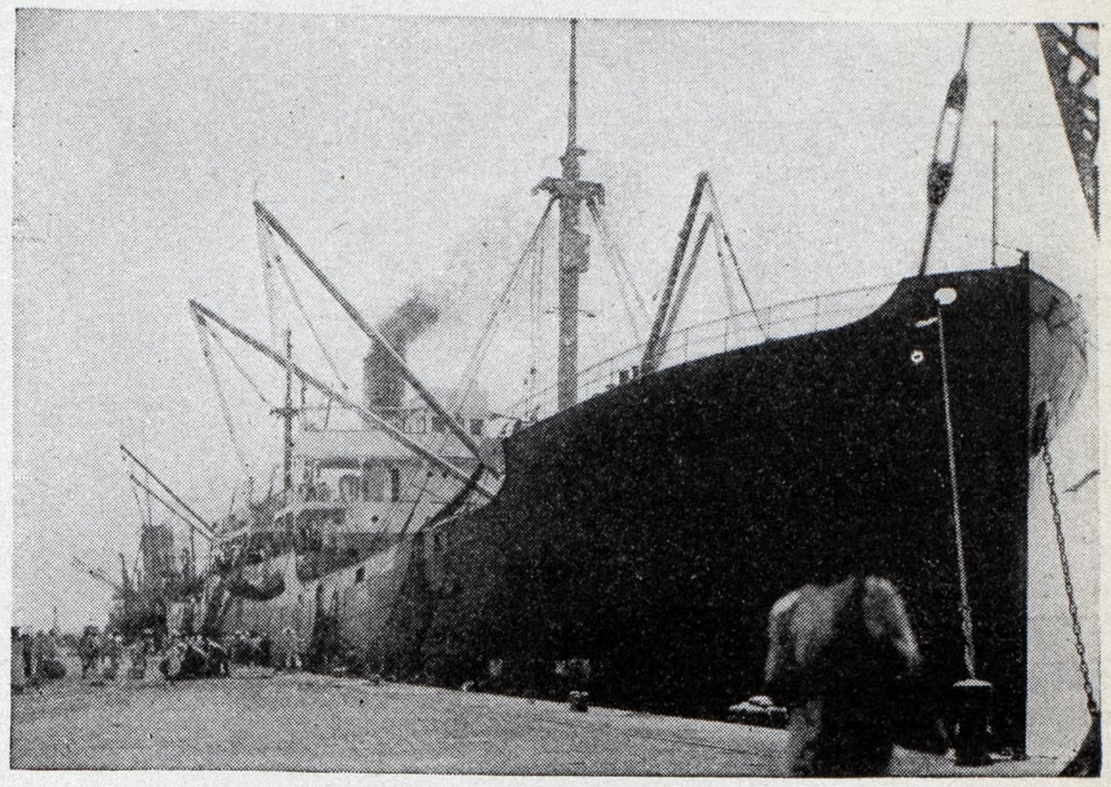
# The Full Facilities of This Fleet are Yours



*An American vessel loading at Cebu, P.I.*

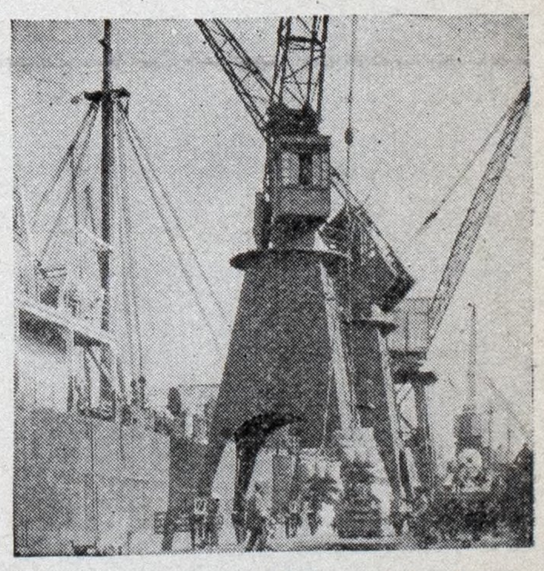
WHETHER you are already engaged in foreign commerce, or are just beginning to ponder its possibilities, you will be rewarded for investigating the facilities offered by the new American Merchant Marine. The advice and counsel of experienced operators is available to help you discover foreign markets, as well as the quickest, most economical route to reach them.

Dependable, fast transportation to all parts of the world is offered by the hundreds of ships in the 17 lines belonging to the United States Shipping Board, and in the many other lines developed by it but now under private ownership. Their service is unrivaled, and their increased use is a boost to national prosperity. Write for full information.

★ ★ ★

*AMERICA FRANCE LINE
*AMERICAN BRAZIL LINE
*AMERICAN DIAMOND LINES
DIXIE UK LINE
*AMERICAN PIONEER LINE
DIXIE MEDITERRANEAN LINE
AMERICAN HAMPTON ROADS LINE
MISSISSIPPI VALLEY EUROPEAN LINE
YANKEE LINE
MOBILE OCEANIC LINE
AMERICAN GULF ORIENT LINE
AMERICAN REPUBLICS LINE
ORIOLE LINES
SOUTHERN STATES LINE
TEXAS MEDITERRANEAN LINE
TEXAS UKAY LINE
TEXAS STAR LINE

**Accommodations available for a limited number of passengers on these lines*



*Discharging oyster shells and lumber at Bristol—illustrating the service to American shippers of the 17 lines listed here.*

## UNITED STATES SHIPPING BOARD MERCHANT FLEET CORPORATION

WASHINGTON, D.C.

**PUMPS—Continued**
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.

**PUMPS (Ballast)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Bilge)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Boiler Feed)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Direct Acting)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Fuel Oil)**
Coen Co., Inc., 610 S. Broadway, Los Angeles, Cal.

**PUMPS (Power)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Steam)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PUMPS (Vacuum)**
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

**PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS**

**RADIO COMPASS AND DIRECTION FINDER**
Radiomarine Corp. of America, 66 Broad St., New York City.

**RADIO EQUIPMENT**
Radiomarine Corp. of America, 66 Broad St., New York City.

**RAFTS**
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

**RAILWAY DRY DOCKS**
Crandall Engineering Co., The, 134 Main St., Cambridge, Mass.

**RANGES**
Stamford Foundry Co., Stamford, Conn.

**REFRIGERATING MACHINERY**
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City

**REPAIRS**
Maryland Dry Dock Co., Baltimore, Md.

**REPAIRS (Electric)**
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**REPAIRS (Marine)**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Charleston Dry Dock & Machine Co., Charleston, S. C.
Chicago Shipbuilding Co., So. Chicago, Ill.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City

**REPAIRS (Marine Engine)**
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.

**REPAIRS (Turbine)**
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**REVOLUTION COUNTERS**
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

**ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)**
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

**ROPE (Transmission)**
Columbian Rope Co., Auburn, N. Y.

**ROPE OAKUM**
Stratford, George, Oakum Co., 120 Montgomery St., Jersey City, N. J.

**RUBBER TILE**
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

**RUDDERS**
Oertz Streamline Rudder Co. 75 West St., New York City.

**RUST PREVENTATIVE (Oil)**
Vacuum Oil Co., 61 Broadway, New York City.

**SAFETY VALVES (Marine)**
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

**SCHOONERS (Auxiliary)**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Toledo Shipbuilding Co., Toledo, O.

**SEARCHLIGHTS (High Intensity)**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**SEARCHLIGHTS (Incandescent and Arc)**
General Electric Co., Schenectady, N. Y.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**SELF UNLOADING EQUIPMENT**
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

**SEPARATORS (Oil)**
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.

**SHIPBUILDERS**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Charleston Dry Dock & Machine Co., Charleston, S. C.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

**SHIPBUILDING SYSTEMS**
Isherwood, J. W., & Co., Ltd., 17 Battery Place, New York City.

**SHIP STABILIZERS**
Sperry Gyroscope Co., The, Brooklyn, N. Y.

**SIGNALS (Submarine)**
Submarine Signal Co., 160 State St., Boston, Mass.

**SOUNDING MACHINES**
Submarine Signal Co., 160 State St., Boston, Mass.

**SPRINGS (Box, Bed)**
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

**SPUN OAKUM**
Stratford, George, Oakum Co., 120 Montgomery St., Jersey City, N. J.

**STEAMSHIP LINES (Passenger and Freight)**
Hamburg-American Lines, 39 Broadway, New York City.

**STEAM GAGES**
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

**STEAM TRAPS**
Davis Engineering Co., 90 West St., New York City.

**STEEL BARGES—See BARGES (Steel)**

**STEEL TANKS**
Brunswick-Kroeschell Co., New Brunswick, N. J.

**STEERING ENGINES**
Hyde Windlass Co., Bath, Me.

**STEERING GEARS**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

**STOKERS**
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

**STORAGE BATTERIES—See BATTERIES**

**STOVES**
Stamford Foundry Co., Stamford, Conn.

**STRAINERS (Oil)**
Coen Co., Inc., 610 S. Broadway, Los Angeles, Cal.

**SUPERHEATERS**
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

**SWITCHBOARDS**
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**TELEMOTORS**
Hyde Windlass Co., Bath, Me.

**TORSION METERS**
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

**TOWING**
Moran Towing & Transportation Co. 17 Battery Place, New York City.

**TOWING LINES**
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

**TRACTORS**
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The. 4205 St. Clair Ave., Cleveland, O.

**TRANSMISSION (Rope)—See ROPE (Transmission)**

**TRUCKS**
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

**TRUCKS (Dump)**
Clark Tructractor Co., Battle Creek, Mich.

**TURBINES (Electric)**
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**TURBINES (Marine)**
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**TURBINES (Steam)**
DeLaval Steam Turbine Co., Trenton, N. J.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

**TWINE AND ROPE**
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

**VENTILATING EQUIPMENT**
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

**VENTILATORS**
Allen Corp., 1040 14th St., Detroit, Mich.

**WATER PURIFICATION SYSTEMS**
Griscom-Russell Co., 285 Madison Ave., New York City.

**WELDERS (Electric Arc)**
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

**WELDING & CUTTING APPARATUS (Oxy, Acetylene, Oxy-Gas)**
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

**WELDING GAS**
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

**WELDING SUPPLIES**
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

**WHISTLES**
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

**WINCHES**
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Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

**WINDLASSES**
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

**WIRELESS MESSAGE SERVICE**
Radiomarine Corp. of America, 66 Broad St., New York City.

**WIRELESS SETS AND APPARATUS**
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**WORKBOATS**
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn.

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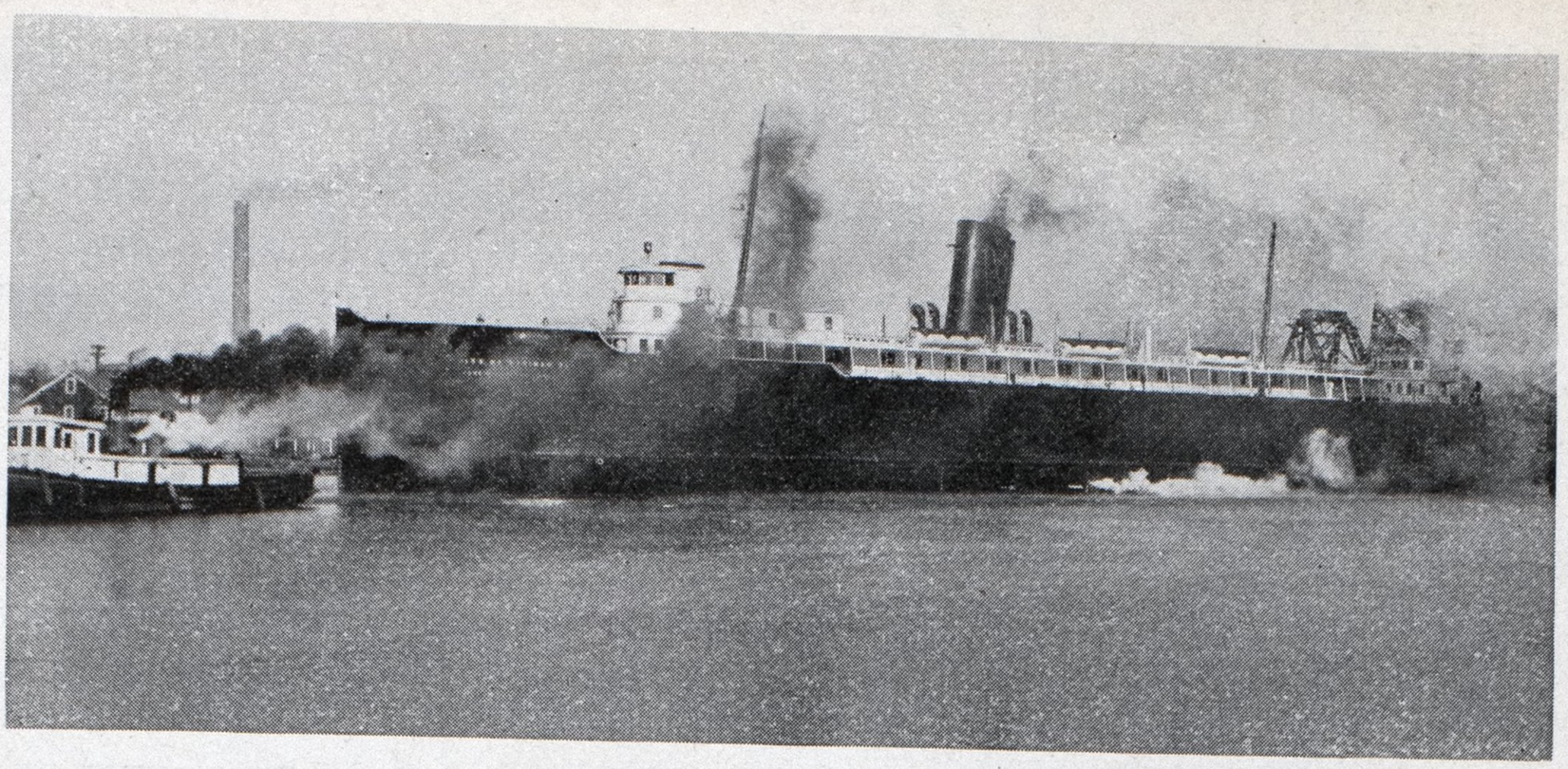

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We design and build steel passenger and freight vessels, carferries, oil tankers, sand suckers, lighters, dredges, yachts, fire boats, tugs, derricks, scows, marine engines and boilers. At this plant you will find excellent facilities, including a 600′ steel floating dry dock, for ship, engine and boiler repairs.

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*Established 1837*

Diving Apparatus and Submarine Armor
Fire Protection Equipment
The Invincible Nozzle

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***Ship Compasses***

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Boiler Repairing Promptly Attended to Day or Night

MARINE WORK A SPECIALTY ELECTRIC WELDING

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**Propeller** Wheels and Blades

***to fit any hub.***

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Plaza 1935

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## BALTIMORE, MD.

Drydocking, Shipbuilding and Ship Repairs of All Kinds

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Floating Machine Shop

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Plant Phones: Curtis 0500 - 0501 - 0502 - 0503

# Classified Advertisements

## For Sale and Miscellaneous—Help and Positions Wanted

For Sale and Miscellaneous Advertisements
10c per word—minimum advertisement—$3.00

Six words must be added for box address.

To insure insertion, advertisements must reach us by the 10th of the month.

Help Wanted Advertisements
6c per word—minimum advertisement—$3.00

Position Wanted Advertisements
4c per word—minimum advertisement—$1.00

Please have remittance accompany order.

## For Sale

**FOR SALE**
**STEAM TUG "MONITOR"**

70′ x 15′ x 9′ draft, 45-tons gross, oak hull rebuilt 1918, main engine two-cylinder, vertical non-condensing, size 16 x 18, equipped with Scotch Marine boiler, working pressure 150 lbs. Blake steering engine, pumps, complete equipment. Price $3000. Detailed specifications furnished on request. St. Lawrence River Power Company, Massena, New York.

## Position Wanted

**WANTED: POSITION AS CHIEF ENGINEER** on Yacht, Passenger or Ferry boat. Will go anywhere. Have U. S. license for steam or diesel ships of any tonnage. Have a number of years experience at sea. Also shop experience installing engines. Will furnish best of references, as to ability and character. Write or wire Archie C. Rolfe, 1400 Washington St., Bath, Maine.

---

**POSITION WANTED: AS ASSISTANT TO** executive, junior executive, or representative of steamship company, vessel brokers, forwarding company, shipbuilding company, or manufacturer of marine equipment. Young man, single, thirty years old, graduate leading school of commerce, four years with Great Lakes passenger and package freight line, member family of steamship operators. Have traveled United States, Canada, European and Mediterranean countries and willing to go anywhere in those countries. Available immediately. Box 419, MARINE REVIEW, Cleveland, Ohio.

## For Sale

**LIGHTER**
**FOR SALE**

One new steel combination oil and deck lighter—80 x 26 x 6 ft. Charleston Dry Dock & Machine Company, Charleston, S. C.

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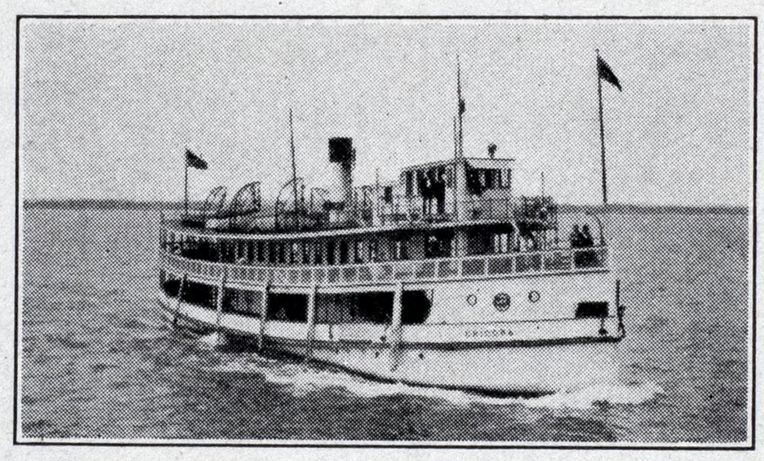

**ON ACCOUNT OF DISCONTINUING AMUSE**ment Park for subdivision will sell two steel Passenger Steamers—S.S. Bedell, length 104 feet, breadth 28 feet, draft 8 feet, 700 passengers. S.S. Chicora, length 124 feet, breadth 33 feet, draft 8 feet, 1000 passengers. Both in first class condition. Details on application—Erie Beach Park, Ltd., 402 Walbridge Building, Buffalo, N. Y.

## For Sale

**FOR SALE: MARINE ENGINES AND** boilers of all sizes; light draft wooden and steel tug boats for sale or charter; derrick boats, deck scows and lighters for sale or charter. Cowles Towing Co., Buffalo. N. Y.

---

**FOR SALE**
**STEEL TOW BARGE**

"Swederope" 227′ long, 38′ beam, 19′6″ deep. Detroit Sulphite Transportation Co., 9125 W. Jefferson Ave., Detroit, Mich.

## Wanted

**WANTED — FREIGHT AND PASSENGER** Steamer, about 150-foot keel, with Cabin accommodation and clearance between decks for autos. Pay cash. Owen Sound Transportation Co., Ltd., Owen Sound, Ontario.

---

**WANTED**

Small freight and passenger steamer, about 150′ long of 400 ton capacity at draft of 10′ Passenger accommodation desirable but not essential. Box 420, MARINE REVIEW, Cleveland, Ohio.

---

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The classified section of MARINE REVIEW is for your convenience—its value is proving very worthwhile to everyone who uses it to buy and sell.

If you want to buy or sell ships or marine equipment—need a man for your organization—make it known to the entire marine industry through the use of classified advertising in MARINE REVIEW.

Mail copy for your advertisement in the January issue today, so it reaches us before December 20.

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realize that the basis of their success rests on economical and efficient drydocking equipment.

Progressive yards are coming more and more to be CRANDALL equipped for they know that

## Crandall Railway and Floating Dry Docks

mean economy and efficiency, and that the designs are backed by more than 75 years of successful dry dock experience.

*Let us send you further information*

**The Crandall Engineering Co.**

**134 Main Street** **Cambridge, Mass.**

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**BY SEALED BIDS**

**to be opened by the**

**BUREAU OF SUPPLIES AND ACCOUNTS, NAVY DEPARTMENT WASHINGTON, D. C.**

**at**

**11:00 A. M. (Eastern Standard Time)**

**17 DECEMBER, 1930**

The following vessel will be offered:

**U. S. S. ESSEX**

*Description:*

| | |
|---|---|
| Length between perpendiculars | 185' 0" |
| Beam | 35' 0" |
| Mean draft | 14' 3" |
| Displacement | 1,375 tons |
| Hull | Wood |
| Type | Old Gunboat |

Built by Navy Yard, Kittery, Maine
Date Built: 1876
Location: Alongside Minnesota Naval Militia Dock, Duluth, Minn.

Catalog No. 364-B, containing description, terms and conditions of sale, etc., may be obtained from the Commandant, Ninth Naval District, Great Lakes, Illinois, or from the

**BUREAU OF SUPPLIES & ACCOUNTS NAVY DEPARTMENT WASHINGTON, D. C.**

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On board the new American Export Liner, "Excalibur" . . . on board the new Ward Liner, "Morro Castle" . . . on board the new Grace Liner, "Santa Clara" . . . on board the new American-South African Liner, "City of New York" . . . on board the new Coast Guard Cutters, "Itaska", "Sebago", "Saranac".

In fact, on board most all of the outstanding new ships—and the older ones—you will find Paracoil equipment holding responsible positions.

Paracoil Feed Water Heaters, Evaporators, Distillers, Lubricating Oil Coolers, etc., etc., have been standard marine equipment for many years.

Write for bulletins.

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Hendrik Hudson
Alexander Hamilton
President Garfield
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City of New York
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Sebago
Saranac
etc., etc., etc.

# Star Brass Mfg. Co.

53 Oliver Street -::- Boston, Mass.

MANUFACTURERS OF

Accurate "Non-corrosive" Pressure and Recording Gauges, Revolution Counters, Marine Clocks.

Dead Weight Gage Testers.

Marine, Safety and Relief Valves for all pressures.

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Extra Heavy Renewable Globe, Angle and Check Valves.

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SPECIFY AND ORDER THE BEST.

Branches: CHICAGO PITTSBURGH NEW YORK

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WERE SUPPLIED TO THE

# BYRD ANTARCTIC EXPEDITION

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**Brooklyn, N. Y.**

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**PASSENGER SERVICES:** New York to Cherbourg, Southampton and Hamburg. New York to Galway, Cobh (Queenstown), Cherbourg and Hamburg. North Pacific Ports to Hamburg, Bremen and Antwerp via Panama Canal.

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**39 Broadway** **New York**

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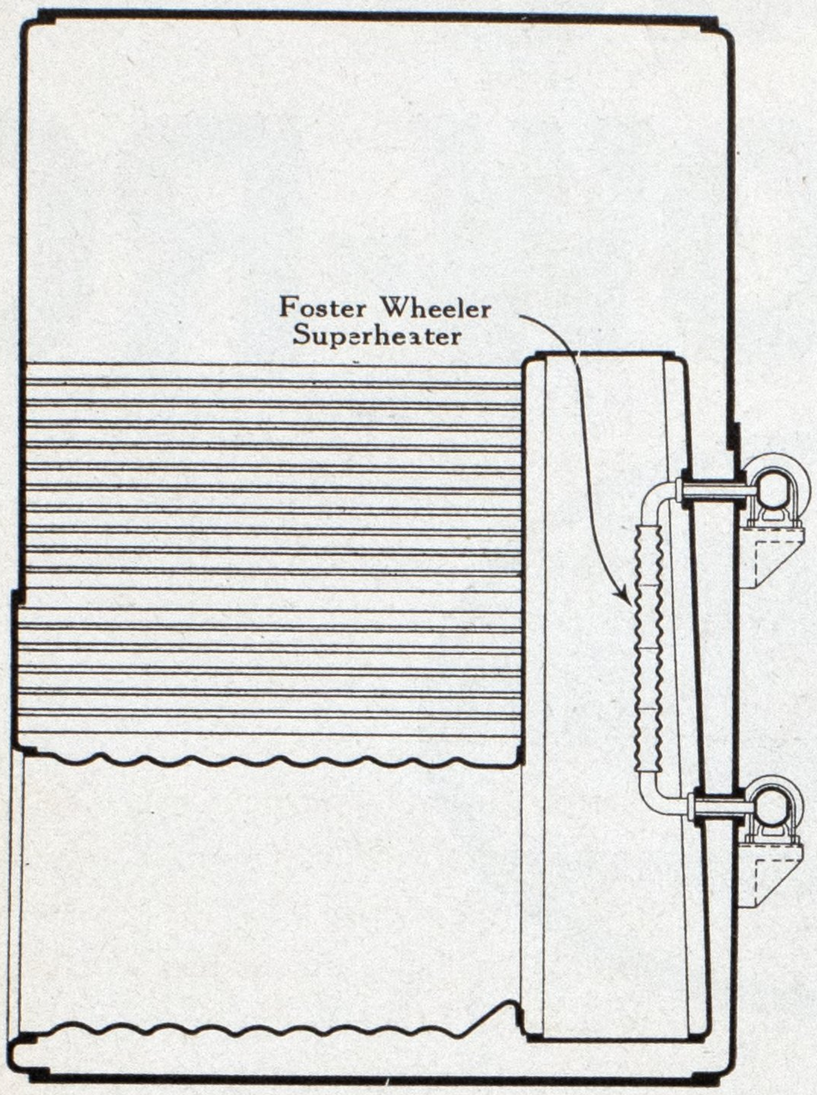
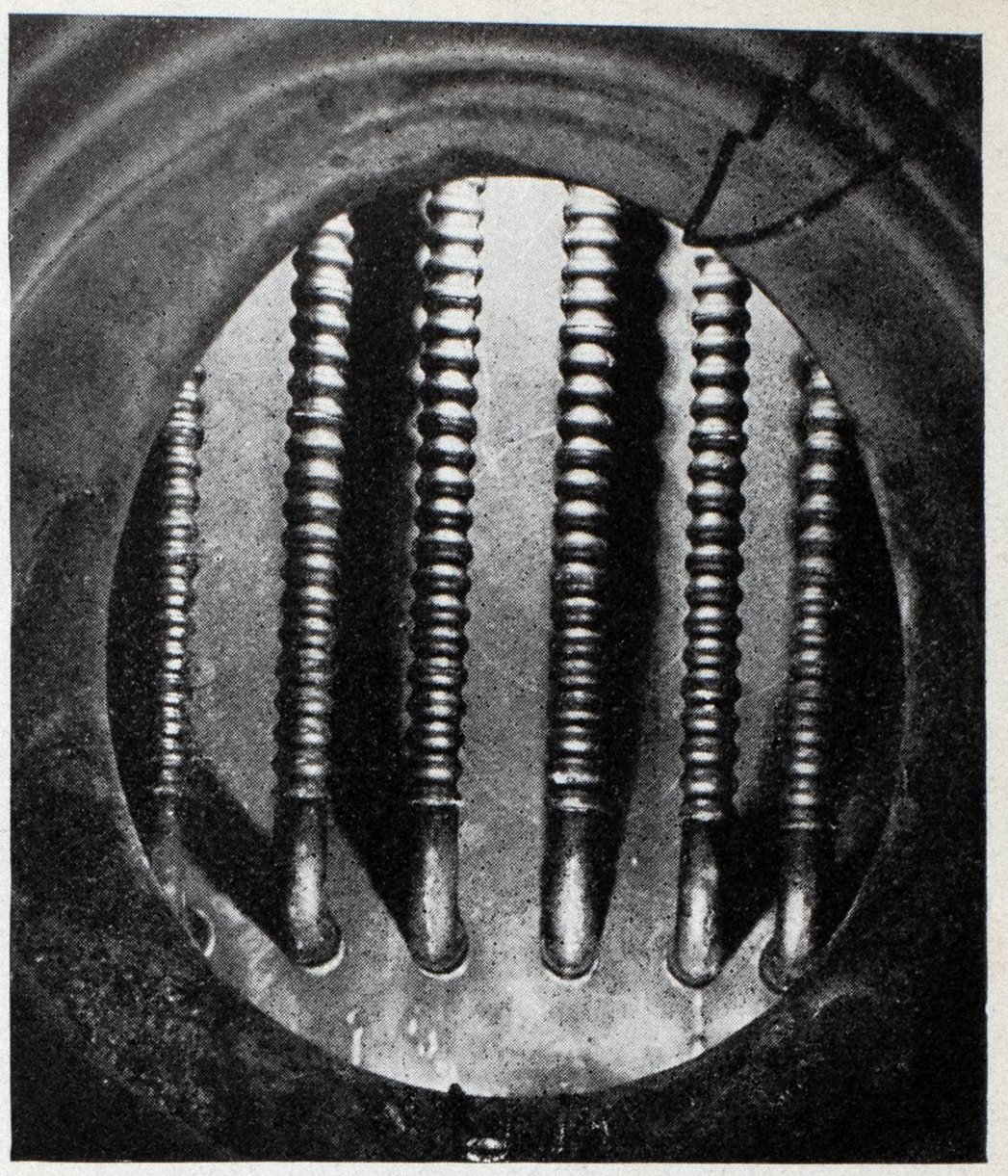



*Arrangement of Foster Wheeler superheater installed in the combustion chamber of a Scotch marine boiler.*



*Photograph of Foster Wheeler superheater installed in the combustion chamber of a Scotch boiler showing sturdy armored construction of the superheater elements.*

# Superheaters for Scotch Boilers

Marine superheaters installed in the combustion chambers of a Scotch boiler, are shown above. The photograph was taken looking through the furnace opening into a combustion chamber of the furnace.

Such superheaters have been in use for long periods and have proven highly satisfactory. The superheater elements are of seamless steel tubing covered with cast iron. The iron is poured directly upon the curved portion of the tubes and iron castings are shrunk upon the straight sections of the tubing. This construction gives a virtually indestructible element, yet one that is easy to clean internally, easy to replace if necessary, and completely drainable.

Foster Wheeler superheaters have been operating satisfactorily in the combustion chambers of Scotch Marine boilers since 1921. They provide substantial fuel savings, great reserve power and eliminate erosion of valves and turbine blades by water.

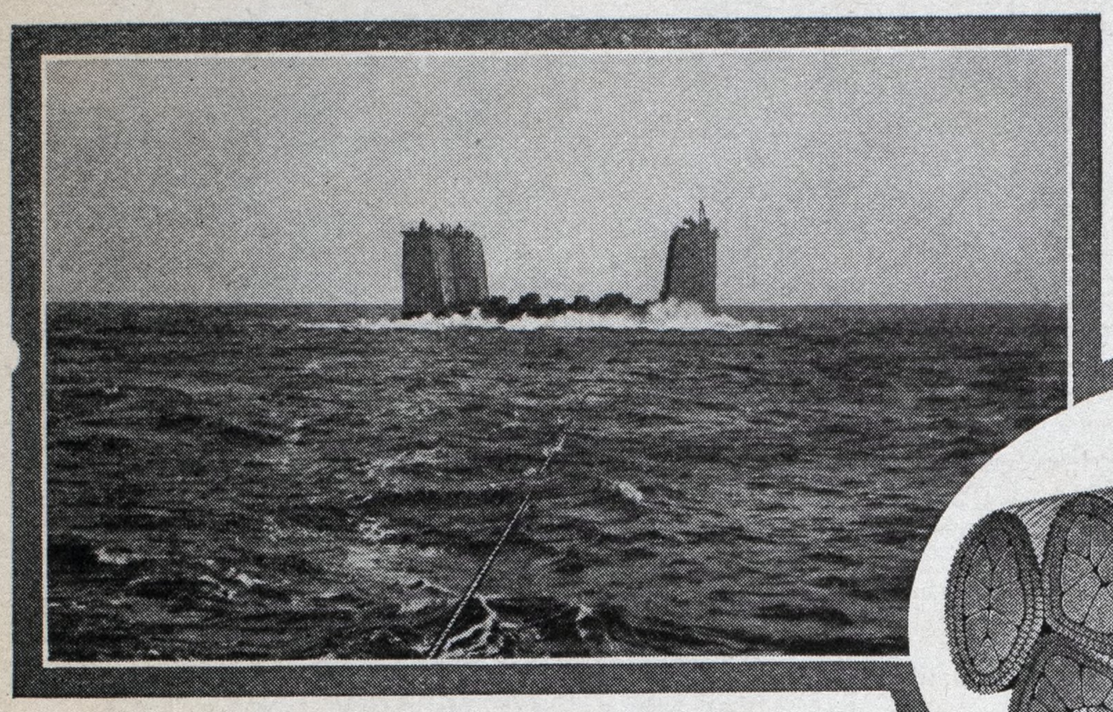
## FOSTER WHEELER CORPORATION

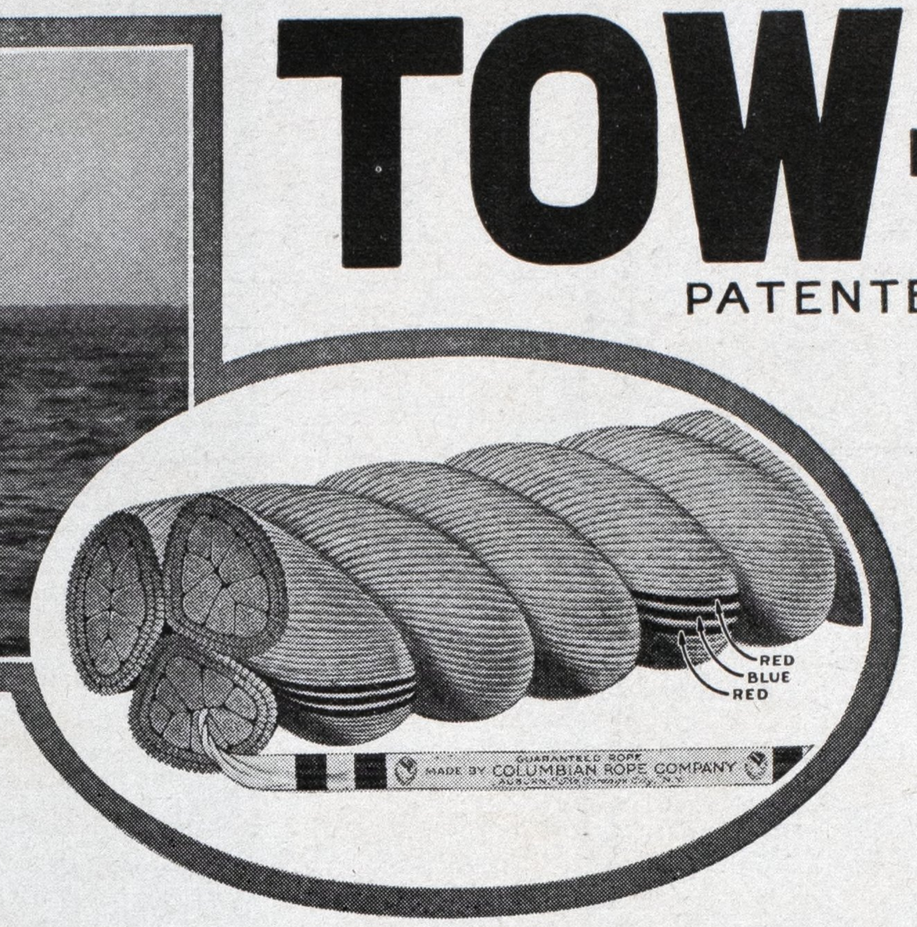
**165 Broadway, New York, N. Y.**

***Representation in Principal Ports: Canada, Europe, Honolulu***

# COLUMBIAN TOW-RO

PATENTED






Columbian Manila Tow-Ro is a specialist, made for just one purpose — towing — every kind of towing. Use Tow-Ro when you have a tough towing job. It will show you that its new construction makes it superior to any line you have ever used.

Here is the way Columbian Tow-Ro stacks up on paper. A strong, tough double-thickness of regular size yarns comprises the outside jacket. This jacket resists outside abrasive wear and securely protects the heart of the line. This heart is a new type of construction that does the business. It is composed of large slightly pre-twisted yarns which not only give the line a great surplus of strength but also assure that it will keep its shape.

To make Tow-Ro still more desirable, it has flexibility without distortion, it is thoroughly waterproofed, it can be easily spliced and is positively guaranteed by the famous Columbian *Tape-Marker*. It is also readily identified by the red, white, blue, white and red, surface markers.

If these qualifications look good to you on paper, try Columbian Tow-Ro on your next job. What it will do for you when you actually use it knocks the spots off anything we can tell you about it. It is the towing line with a wallop—the king of Tow-Lines! Use Columbian Tow-Ro.

**COLUMBIAN ROPE COMPANY**

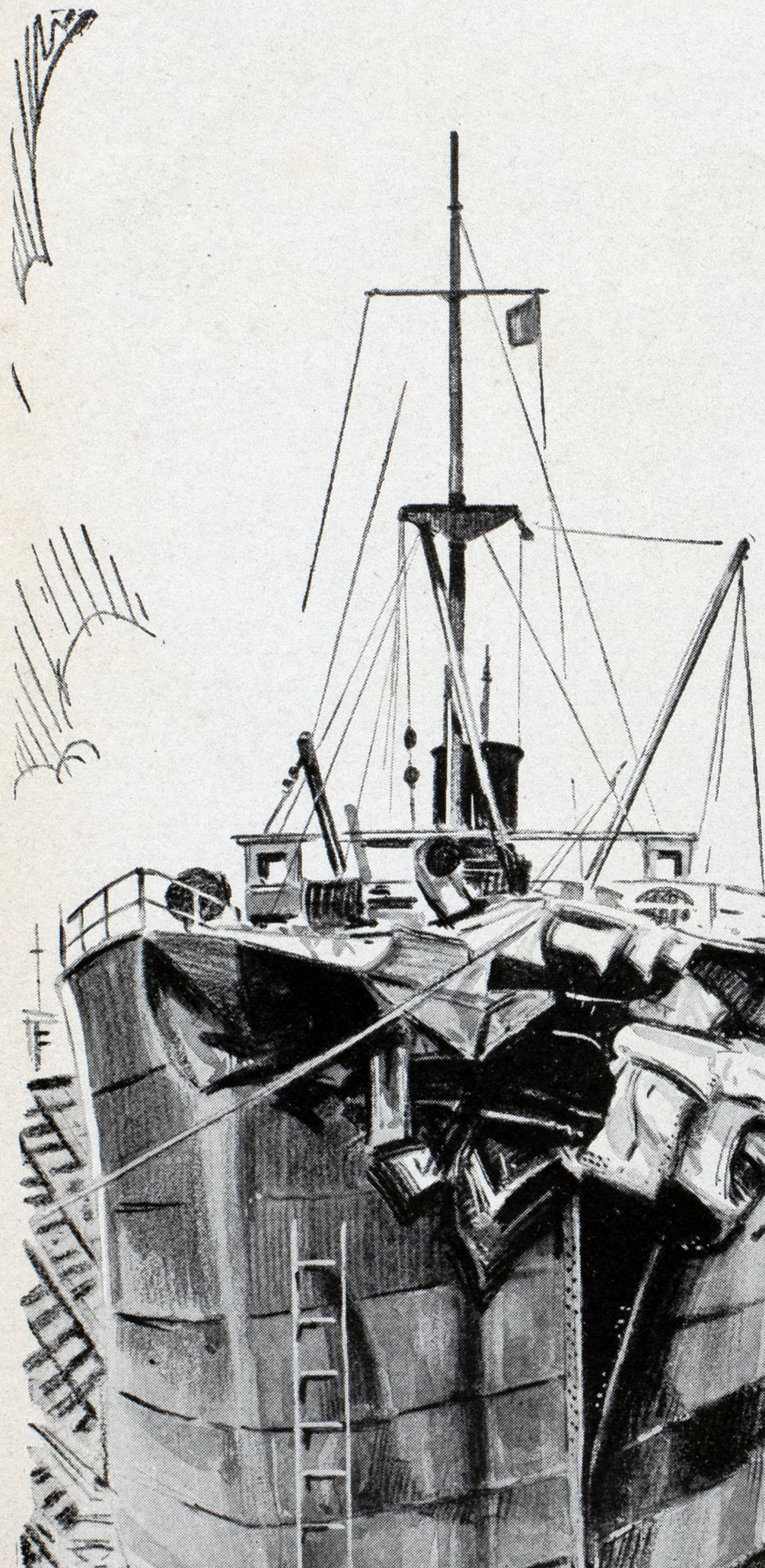
**332-90 Genesee Street**

**Auburn, N. Y. "*The Cordage City*"**

**Branches— New York Chicago Boston New Orleans Philadelphia**

# MORE TOWING MILES PER LINE

# Ship repairs at Newport News



REGARDLESS the size of the job—whether it is serious bottom or bow damage, routine underwater work or voyage repairs, the resources, efficient organization and unlimited facilities at NEWPORT NEWS offer singular service for the repair of ships.

These facilities, which include three large graving docks, foundry and forge shops, insure immediate attention—savings in time and labor and a speedy return of the vessel to service.

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## Newport News Shipbuilding and Dry Dock Company

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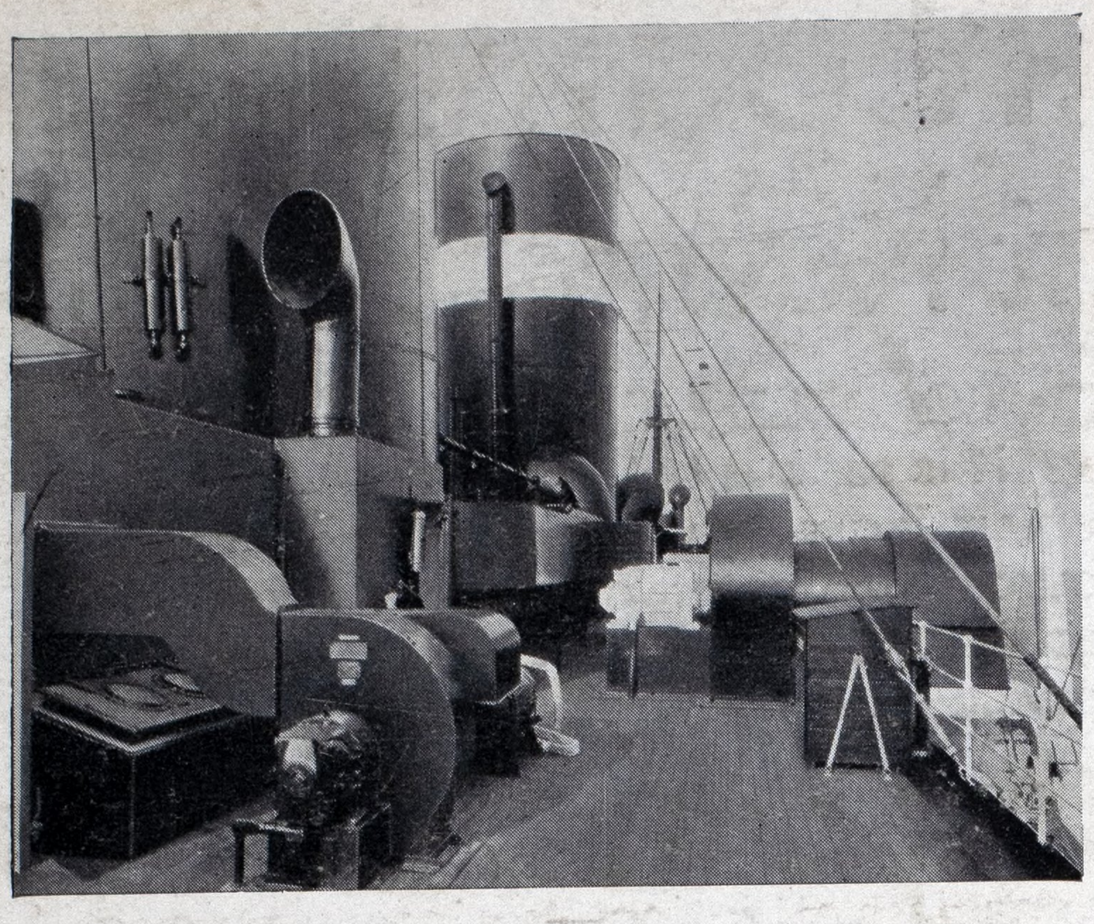

## Do They Sleep Soundly?

When your passengers get up in the morning are they refreshed from a good night's sleep? If they have been sleeping on the boats equipped with Sturtevant ventilating fan, the chances are that the fresh cool sea air has filled them with new zest and vigor.

Sturtevant Ventilating equipment has been the standard by which all other systems have been measured for over fifty years. They are both quiet and efficient. We put into them the experience gained from sixty-six years of building air handling equipment.

*A request will bring you complete information on this very important subject of marine ventilation.*

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*Sales Engineering Offices in Principal Cities*

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If You Want The Best Specify

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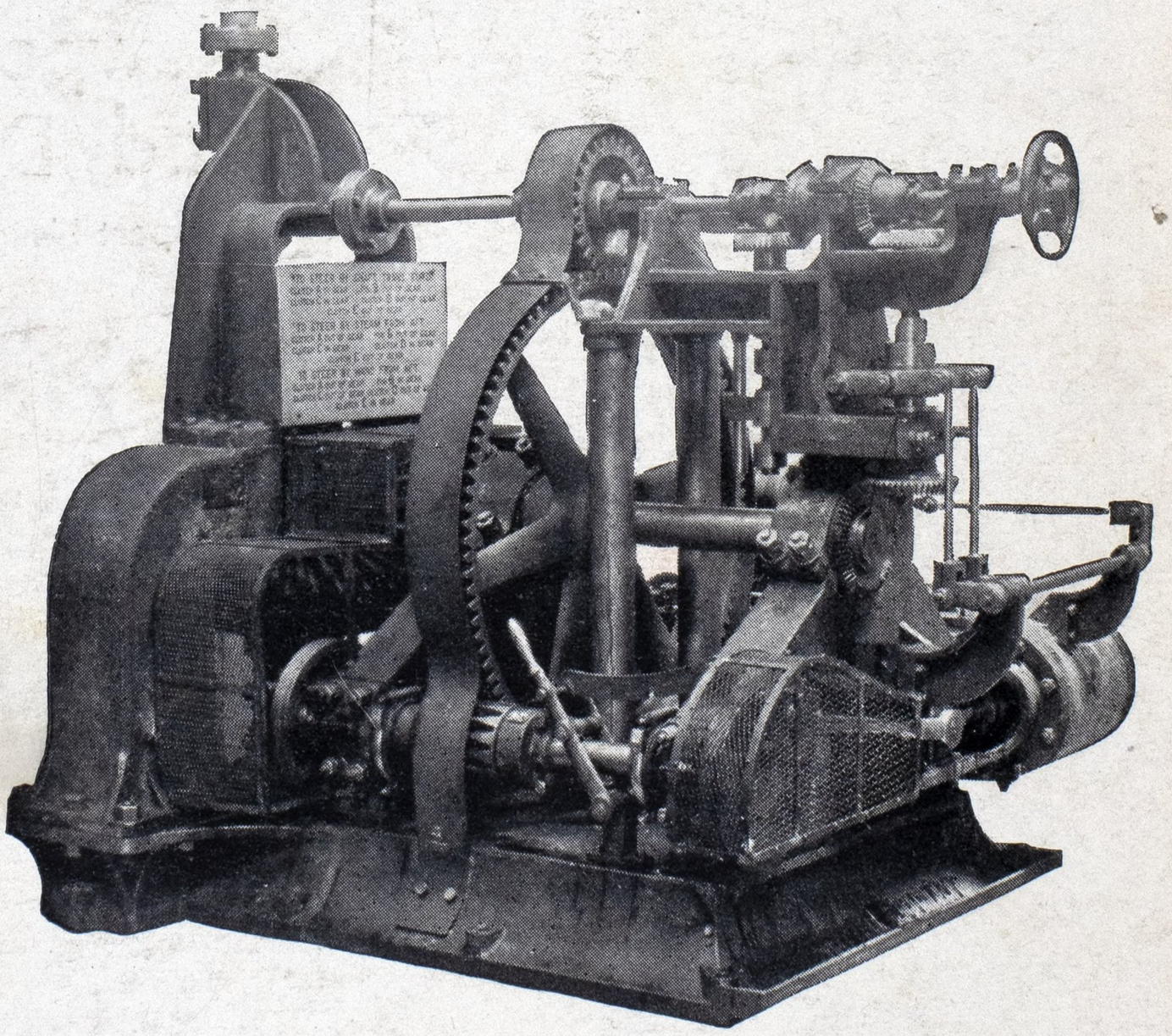
S. S. "B. F. AFFLECK" owned by Pittsburgh Steamship Co. and built by Toledo Shipbuilding Co.

S. S. "S. T. Crapo" owned by Huron Transportation Co. and built by Great Lakes Engineering Works.

These three fine new boats are all equipped with

**Hyde**

Quadrant Type Steering Gear
Spur Gear Windlass
Mooring Winches
Hatch Winches



*HYDE Quadrant Type Steering Gear*

# Hyde Windlass Company

## Bath, Maine